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ROUTES

IN

SUPPLIED FOR THE PUBLIC SERVICE.

THE PROPERTY OF THE
HOME DEPTT.
OF THE GOVERNMENT OF INDIA

EGYPT, ABYSSINIA AND ADJACENT COUNTRIES.

PART I—EGYPT.

151

COMPILED, FROM ALL AVAILABLE SOURCES,

UNDER THE DIRECTION OF

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ARMY HEAD QUARTERS, CALCUTTA, 1ST FEBRUARY 1878.

CALCUTTA:
OFFICE OF THE SUPERINTENDENT OF GOVERNMENT PRINTING.
1878.

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CALCUTTA:
PRINTED BY THE SUPERINTENDENT OF GOVERNMENT PRINTING,
8, HASTINGS STREET.

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ROUTES IN EGYPT (SEE LIST OF ROUTES) ... 1

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LIST OF ROUTES.

REVIATIONS.—

Horse Guards Report on Egypt, 1876	H. G. R.
Memoir on Egypt by Lieutenant-Colonel Outram, 1850	Out.
Ditto ditto ditto leMessurier, 1850	leM.
Murray's Handbook for Egypt	Murr.
Linant's Map of Egypt, 1855	Lin.

From	To	By	Authority.	Page.
RED SEA.	**NILE.**			
Berenice	El Agayta	Ancient Road	Murr., KeithJ-ohnston	1
Ditto	Ditto	Modern Road	Murr.	2
Ditto	Edfoo	Emerald Mines	Murr.	*ib.*
Cosseir	Keneh	El Sicca Road	(Genl. Baird) H. G. R., leM.	3
Ditto	Ditto	Derb El Rassafah	H. G. R., leM., Murr., Out.	7
Ditto	El Redisiye	Desert	leM.	9
Ditto	Cairo	Convents and Benesouf	H. G. R., Murr.	10
El Agayta	Guft	...	leM.	11
Ditto	Luxor and Thebes.	Hejaze	Lin.	*ib.*
Ditto	El Redisiye	...	leM.	12
Hammamat	Keneh	Derb el Morij	leM.	*ib.*
Abou Shaar	Ditto	Desert	Murr., Keith-Johnston	13
Suez	Cairo	Derb el Hamra	leM., Lin.	14
Ditto	Ditto	Old Transit Road used by 10th Huss., 1855	Captain Gell, 1854	17
Ditto	Ditto	Derb el Tarabin	leM.	19
Ditto	Ditto	Derb el Ramliyeh	leM., Out., H. G. R.	20
Ditto	Ditto	Derb el Birket, el Haj	leM.	27
Ditto	Ditto	Derb el Angerbeeyeh	leM.	28
Ditto	Nile at Atfieh	...	leM.	*ib.*
Wells of Jandali.	Helwan	...	leM.	29
Suez	Cairo	Nefiche	Macdougall, 1876, Lin., H. G. R.	*ib.*
COSSEIR.	**SUEZ.**			
Cosseir	Suez	Sea Coast	Out., leM., H. G. R.	31
Ditto	Ditto	Ditto	leM.	33

ROADS DOWN THE NILE.

Assuan	Cairo	Left Bank	Lin., Murr., H. G. R., leM.	34
Edfou	Ditto	Right Bank	Lin., Murr., H. G. R., leM.	39

ROADS WEST OF THE NILE.

Benesouf	Fayoum	...	H. G. R., Murr., Lin.	43
Dashour	Medineh	...	Murr., Lin.	44
Fayoum	Oases	El Ghereck	H. G. R., Murr.	*ib.*
Great Oasis	Nile	...	H. G. R.	46
Cairo	Natron Lakes	Teraneh	H. G. R., Murr.	47
Teraneh	Oasis of Siwah	Natron Valley	H. G. R.	48
Alexandria	Ditto	Abousir	H. G. R.	49

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No. of Route.	From	To	By	Authority.	Page.
	CAIRO.	**PALESTINE.**			
33	Cairo ...	El Arish ...	Belbeis ...	Murr., H. G. R., leM. ...	50
34	Ditto ...	Ditto ...	Direct Road ...	H. G. R., Lin. ...	55
	CAIRO.	**MEDITERRANEAN.**			
35	Cairo ...	Alexandria ...	Left Bank of Rosetta Branch.	Murr., H. G. R., Lin., Capt. Gell, 1854.	55
36	Ditto ...	Ditto ...	Proposed for 10th Huss....	Capt. Gell, 1854 ...	57
37	Ditto ...	Ditto ...	Through Delta (Low Nile)	Murr., H. G. R., Lin. ...	60
38	Alexandria ...	Cairo ...	French Route, 1798 (Low Nile).	H. G. R., Lin. ...	61
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40	Cairo ...	Damietta ...	Water ...	Murr., leM., Lin. ...	64
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42	Alexandria ...	Dernah ...	Sea Coast ...	H. G. R. ...	66
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THE PROPERTY OF THE HOME DEPT.
OF THE GOVERNMENT OF INDIA

ROUTES
IN
EGYPT, ABYSSINIA, AND ARABIA.

I.

EGYPT.

I.—HISTORICAL SKETCH.*

Though nominally a tributary state of the Turkish empire, Egypt has been in many respects practically independent since the year 1811. The steps which have led to the attainment of her present political position are worthy of a brief consideration, and commence with the time of Mahamad Ali, born at Kavala, in Macedonia, in the year 1769. Having, at an early age, received a commission in the Turkish army, Mahamad Ali was, in 1798, appointed second-in-command of the contingent of troops furnished by his native place for service in Egypt against the French. Here he soon acquired a high military reputation, and was rapidly advanced, step by step, till, in 1801, he attained to the command of the Albanian corps in Egypt. In the wars between the Mamelukes and the Turks, which followed after the expulsion of the French by Abercrombie's expedition, in 1801, he soon acquired an important and independent position, which he utilised in resisting the oppression imposed on the people. In 1805, he was raised to the dignity of Pacha, and in 1806 became Governor, and subsequently first Viceroy of Egypt. Having conquered the Mamelukes, and in 1811 put aside the chiefs with their retinues, whom he had invited to a feast, at which they were massacred by his order, he had thus made himself master of the country by force of arms. Now, taking the field against the Wahâbis (a religious sect which had sprung up in the second half of the preceding century, and had spread over the whole of Arabia), he seized the holy cities of Mecca and Medina. This success was followed, in 1816, by a marvellous march through the desert to the heart of Arabia, by his son Ibrahim, which ended in the total defeat of the Wahâbi army, the storm-

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* Compiled from the Report of the Horse Guards, Intelligence Department, issued in 1876.

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ing of their capital, Derayeh, in 1818, and the capture of the chief, who was sent a prisoner to Constantinople. Arabia continued for 27 years under the rule of Egypt.

In the years 1820–1822, Mahamad Ali occupied himself with the subjection of Senaar and Nubia, the expedition, under his son Ismail, resulting in the extension of his rule over the whole of the Nile territories down to the southern borders of Nubia. During the next two years his attention was directed to organising his army on a European model under French instructors, and in 1824 he was called upon by the Sultan to assist in subdunig the rebellion of the Greeks. Ibrahim, who led the Egyptian forces, had been successful on all sides, when, in 1827, foreign intervention brought about the battle of Navarino, resulting in the independence of Greece. The governorship of Crete was subsequently conferred on Mahamad Ali for the services rendered by the Egyptian troops in this campaign.

This, however, did not satisfy Mahamad Ali, who had hoped to receive the rich governorship of Syria. He, therefore, soon sought a pretext for a renewal of hostilities, and in 1831 Ibrahim was ordered to invade Syria, with the object of punishing the Pacha of Acre, Abdullah, for seizing immigrated colonists and harbouring Egyptian fugitives, assigning to the Porte as the reason of his attack that Abdullah had offended against the Turkish Government. After Gaza, Jerusalem, and Jaffa had been occupied almost without resistance, Sultan Mahamad, becoming jealous at the increasing power of Mahamad Ali, ordered hostilities to be discontinued. But, in spite of the protest from Constantinople, Acre was laid siege to in December 1831, and both father and son were then sentenced to exile by the Sultan and deprived of their governorships, and an army under Hussein Pacha was marched against Ibrahim. In May 1832, however, Acre fell: Ibrahim occupied Damascus, after having, in July 1832, beaten the Governor of Aleppo, at Homs, also Hamah, Aleppo, Antioch, and Alexandretta. The same month and year he defeated Hussein Pacha at Beylan, and forced him to retreat. Hussein was now replaced in command of the Imperial field army by Reshid Pacha, and an ambassador was despatched to seek the assistance of England. The delay that ensued induced Russia to proffer to the Sultan the aid of a land and sea force to subdue the rebellious vassals—an offer which was eventually accepted, on the intelligence of the complete defeat of Reshid Pacha at a decisive battle near Koniah in December, and of Ibrahim's advance on Brussa and Constantinople. In February 1833, a Russian fleet anchored in the Bosphorus, and an army was assembled at Odessa.

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Meanwhile peace negotiators were sent to both Mahamad Ali and Ibrahim, the Sultan promising to withdraw the sentence of banishment, restore the dignities of which he had deprived them, and make over to Mahamad Ali the governorship of Syria, on condition of his discontinuing hostilities, and giving in his subjection to the Porte. France, jealous of Russia, sought the compliance of Mahamad Ali to this treaty, and the latter sent orders to Ibrahim to arrest his advance. Nevertheless, the Russian expedition sailed in March 1833, landed at Constantinople on April 5th, and formed a camp on the Asiatic coast. The Sultan, now thoroughly alarmed by the action of his friends, proposed a treaty, not only confirming Mahamad Ali in his governorship of Egypt, Crete, and Abyssinia, but transferring to him also the rule of Damascus, Tripoli, Sidon, Aleppo, Acre, Jerusalem, and Nablus, with, for his son, the bestowal of the dignity of Sheik-el-Harem of Mecca and the governorship of Jedda and Adana, in Syria. This was notified in an Imperial Firman of May 6th, and Ibrahim withdrew his army.

It was evident, however, that this treaty could not last, for Mahamad Ali had not attained his real object—namely, the independence of Egypt and the hereditary succession of his family to the throne; while Sultan Mahamad was embittered against him by the loss of several provinces. Mahamad prepared for renewed hostilities in 1839, on the plea of the irregular payment of the promised tribute, and of the Viceroy's obstruction to the carrying out of a commercial treaty concluded in July 1838 between the Porte, Austria, and England. In the campaign that now followed, the Turkish army was completely defeated at the battle of Nezib on June 24th, 1839, and the whole Turkish fleet was at the same time treacherously surrendered by the Turkish Admiral. As a condition of peace, Mahamad Ali now demanded the hereditary succession of his family to the throne of Egypt and its dependencies, of Syria with Adana, and of Crete. This demand was backed up by France, but the other great powers decided at the Treaty of London, July 15th, 1840, to maintain in its entirety the integrity of the Ottoman empire. Mahamad Ali refused to submit to this treaty, and an Anglo-Austrian fleet was despatched to the Syrian coast, which reduced, among other places, Beyrout, Tripoli, Sidon, Tyre, and Acre, and was then proceeding to bombard Alexandria when Mahamad Ali came to terms; he agreed to evacuate Syria, restore the Turkish fleet, stipulating, however, for the retention of Egypt.

In January 1841, an Imperial Hatti-Sherif issued under the guaran-

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tee of the five great powers, established the position of Mahamad Ali as a vassal of the Porte, and the hereditary succession to the throne of Egypt, under the same rules and regulations as that to the throne of Turkey. The Firman of Investiture of June 1841, which guaranteed afresh the possession of Egypt and Nubia with the hereditary succession to the throne, provided for the introduction of the same fundamental laws as those of Turkey, and for the extension to Egypt of the treaties of the Porte with foreign powers: moreover, that the taxes should be levied in the name of the Sultan, the coinage be stamped with his name, the strength of the army reduced to 18,000 men, the appointment of the superior officers subject to confirmation by the Sultan, and an annual tribute paid to the Porte. The title given to Mahamad Ali and his immediate successors was the Turkish "Vali," or Viceroy.

The political position of Egypt is thus not unnaturally regarded by the people as due to her brilliant victories over Turkish arms rather than to the favour of the Porte. Mahamad Ali, brought up under the prejudicial teachings of the *Koran*, evinced a rare judgment and tact in his method of dealing with this doctrine wherever it struck banefully at the interests of the State. The courage with which he loosened the chains religion had bound around the State, is worthy of admiration when the narrow-minded fanaticism of Mahamadan belief is considered; and it is to this that Egypt must ascribe her regeneration, and her material as well as moral progress. He organised an army, which, during his numerous campaigns, he raised to a strength of from 100,000 to 200,000 men on a French model, completely reformed the system of justice and administration, sequestrated the mosque lands, founded the Military Academy at Cairo, introduced education among his people, sent missions to foreign countries for purposes of scientific improvement, and thus laid the foundation of Western civilisation. In 1843, he appointed his grandson, Abbas, his representative at the helm of the State; but a few years later, in 1848, a mental disease forced him to resign the throne to the heir presumptive, his son Ibrahim, who, however, died within a few months of his accession. In accordance with the right of succession, Abbas followed Ibrahim; he made a mistaken and ineffectual attempt to obtain Egypt's independence by seeking the aid of the Wahâbis and Bedouins against the Sultan, and with this view released the Wahâbi leaders from their captivity in the citadel of Cairo. He had, however, miscalculated their allegiance; for instead of joining with him, they at once took up arms against him, drove the Egyptians from Nejd, and restored

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the independence of the Wahâbi State. Mecca and Medina had been already given over to the Porte by Mahamad Ali, in accordance with the treaty of London of July 1840. Hatred of European civilisation made Abbas sweep away many of the institutions which Mahamad Ali had introduced, but his reign was not of long duration; he died in July 1854, and was succeeded by Mahamad Ali's next surviving son, Said, who had been trained under French instructors, and had, during several visits to Europe, acquired a thorough conviction of the advantages of European culture. Treading bravely and unhesitatingly in the steps of his father, he introduced a series of healthy reforms, inaugurated railways and telegraphs, and promoted with all his energy the Suez Canal. During the early part of his reign he devoted himself chiefly to his army, moving about from place to place with a large camp of men, and spending vast sums of money on military institutions and the great defensive works at the Barrage of the Nile. When, however, he subsequently was induced to turn his attention rather to commercial and industrial improvements, he disbanded the army in so wholesale a manner as to call forth the remonstrance of the Porte; but at his death, in 1863, it had sunk to only 3,000 men, the *personnel* disorganised, and the *matériel* deficient: in the event of war scarcely 15,000 men could have been placed in the field. Said was succeeded by Ismail Pacha, second son of Ibrahim, whose first care was to re-organise the army and promote the military power of the State; he demanded of the Porte permission to raise the army from 18,000 to 30,000 men, and at the end of seven years had made such progress as to have it in his power to place in the field a thoroughly armed and equipped force of 100,000 men. In May 1866, a Firman of the Sultan changed the title of the ruler from Viceroy to Khedive, and made the succession to the throne direct—*i. e.*, from father to son, instead of, as after the Turkish law, descending to the eldest heir; in return for this concession, Ismail raised the annual tribute paid by Egypt to the Sultan from 80,000 purses* to 150,000 purses. By a last Firman of June 1873, the Khedive, moreover, received from the Sultan the right to conclude commercial treaties with foreign powers, to maintain what force of men he pleased, and uncontrolled authority in the internal administration of the country—a right which has raised him, so to speak, to the rank of absolute Sovereign. The connection with Turkey is a source of disadvantage and weakness to Egypt. She is bound, namely, when called upon, to furnish contingents of troops for fighting purposes; and a large

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* The purse may be taken at £5 2*s*. 6*d*. sterling; but the value is variable.

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number of men perished in the Crimea or in the Black Sea off Sinope. During this war, Egypt furnished 24 battalions, 4 squadrons, and 6 batteries of four guns, altogether some 21,000 men, which was, indeed, 6,000 over the strength fixed by law, *viz.*, 15,000. In 1866, a contingent of 10,000 men was sent to Crete, to aid in suppressing the rebellion in that island. Again, in 1869, 20,000 men were held ready, when war between Greece and the Porte appeared imminent. The Imperial Firman of May 1866 was not wrested from the Porte without the outlay, in Constantinople, of some 2½ millions sterling; and the last Firman of June 1873 was only obtained at the cost of a present of nearly a million from the Khedive to the Padshah, besides a further lavish expenditure in Constantinople. A stream of gold has thus been pouring from Egypt to Constantinople, and but little material gain is reaped in exchange.

Recent events tend to show that, in addition to gaining her total independence, Egypt has a civilising mission to carry out in the east of Africa; with the extension of her frontiers, she cannot refrain from an extension of power—hence the military expeditions against Abyssinia, the occupation of Berber, the expeditions under Baker and Gordon, the campaign against Darfur where the Sultan's army was completely beaten on two occasions, June 17th and July 2nd, 1874, and which has since been incorporated with Egypt, and the war against Abyssinia. It appears as if, step by step, Egypt were destined ere long to occupy the whole of the Nile territories. Nor will extension of territory in Africa probably long satisfy the Egyptian Government; for since the opening of the Suez Canal, the shores of the Red Sea have become of extreme importance to her, and the Khedive has repeatedly, though vainly, asked of the Porte the governorship of Yemen. Possession of the eastern shore of the Red Sea, and of the holy city of Mecca, would raise incalculably the prestige of Egypt; during the long period of 27 years the Arabs were subject to her, and the trace of her rule is still visible in the continued trade routes. It is far from improbable that Egypt, indeed, contemplates the eventual recovery of all that Mahamad Ali gained by force of arms.

II.—POLITICAL ADMINISTRATION.

The present Sovereign was born at Cairo in 1830, and has been the means of introducing many most beneficial reforms and institutions,

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among which may be mentioned the abolition of the slave trade; the accomplishment of that great undertaking, the Suez Canal; the creation of schools and diffusion of education in general; the construction of railways; the extension of the telegraph; and the Government control of the postal service.

The administration is conducted by a Council of State, composed of four military and a similar number of civil dignitaries, appointed by the Sovereign and by a Chamber of Delegates, instituted by the reigning Prince himself in 1867, with a view to the establishment of a representative form of Government. The Chamber is composed of men selected from the most prominent persons of the State, and is intended to advise, when called upon, in the conduct of public business.

The area and population are known only very approximately. Egypt Proper extends southward to the 1st Nile Cataract, about the 24th degree north latitude; and westward, so far as she is known *at present* to have extended her rule over the oases and the Bedouin tribes of the Lybian deserts, to a line which may be generally defined by an arc described with the centre at the Great Bitter Lake on the Suez Canal and with the radius to the 1st Nile Cataract, which will be found to strike the Mediterranean at the frontier between Egypt and Barca, *i. e.*, about east longitude 25 degrees; the north-eastern boundary runs from the head of the Gulf of Suez, north-east, along a line connecting Suez with El-Arish, the frontier station on the trade route to Syria; the Red Sea and the Mediterranean fix her boundaries in the south-east and north respectively. These boundaries represent an extent of about 10,171 geographical square miles. But, besides Egypt Proper, the dominion of the Khedive extends over the whole of the Soudan, including Nubia, Senaar, Dongola, Taka, Fazoglu, Kordofan, and the provinces of the White Nile and Khartum; the residence of the Governor General of the Soudan is at the town of Khartum, at the confluence of the White and Blue Niles. The coast of the Red Sea down to the important trading town and harbour of Massowah, 15° 34′ north latitude, is now under the rule of the Khedive, and in 1874 the province of Darfur was annexed. The extent of the Soudan, &c., is vaguely estimated at some 30,800 geographical square miles. Thus the total area under the rule of the Sovereign of Egypt is somewhere about 40,900 geographical square miles. Egypt Proper is divided into three great districts, known as Lower, Middle, and Upper Egypt, the demarcations of which are defined by the course of the Nile; and these three districts are again

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sub-divided into eleven special town governments and thirteen administrative provinces, with a population estimated in 1872 as follows :—

Special Town Governments.

	Population.
1. Cairo	349,883
2. Barrage	3,017
3. Alexandria	212,034
4. Rosetta	15,002
5. Damietta	29,333
6. Port Said	8,671
7. El-Arish	2,284
8. Ismailia	3,062
9. Suez	13,498
10. Souakin	4,078
11. Massowah	2,351
TOTAL TOWN GOVERNMENTS ...	643,263

Administrative Provinces.

Lower Egypt—	
1. Beheira (chief town Damanhour, population 25,000), comprising 22 towns and 253 villages	213,556
2. Ghizeh (Ghizeh, 10,500), comprising 3 towns and 160 villages	153,745
3. Kalioubiyeh (Benha, 5,170), comprising 3 towns and 159 villages	190,964
4. Sharkiyeh (Zagazig, 40,000), comprising 11 towns and 429 villages	401,287
5. Menoufiyeh (Shibin, 12,380), comprising 13 towns and 331 villages	447,917
6. Gharbiyeh (Tantah, 60,000), comprising 36 towns and 484 villages	629,763
7. Dakahliyeh (Mansowrah, 16,000), comprising 4 towns and 437 villages	500,304
Middle Egypt—	
8. Beni-Soweif and Fayoum (Beni-Soweif), comprising 4 towns and 155 villages	279,678
9. Minieh (Minieh), comprising 2 towns and 259 villages	325,096
Upper Egypt—	
10. Assiout (Assiout, 27,470), comprising 4 towns and 281 villages, within the oases 14 villages	433,111
11. Girgeh (Souhag), comprising 4 towns and 188 villages	378,237
12. Keneh (Keneh, 13,200), comprising 5 towns and 102 villages	297,614
13. Esneh (Esneh), comprising 2 towns and 87 villages ...	251,742
Add for resident strangers ...	5,480
TOTAL ADMINISTRATIVE PROVINCES ...	4,606,494
GENERAL TOTAL ...	5,251,757

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The territories on the Upper Nile are put down at some 11½ millions, but any estimate must be extremely vague. The total population of the territories, collectively embraced under the rule of the Khedive, is thus calculated at nearly 17 millions. Of this population, about 80,000 are officially reported to be foreigners, Alexandria alone comprising 47,000, of whom about 22,000 are Greeks, 7,000 Italians, 10,000 French, 4,500 English, 3,000 Austro-Hungarians, and the rest Germans, Spaniards, Russians, &c.

The revenue for the year terminating September 10th, 1874, was calculated at 12,982,394 purses, equal to about £9,911,000, and the expenditure at 1,763,128 purses, equal to about £8,816,000, leaving thus a surplus of 219,166 purses, equal to about £1,095,000. Of the expenditure the Ministry of War and Marine took up 158,928 purses. The chief sources of revenue from direct taxation are the ordinary land-tax, at the rate of about £1 1*s.* 2*d.* per acre, and levied on about 3½ million acres; the tax on tithe lands, at the rate of 6*s.* 2*d.* per acre, levied on about 1¼ millions of acres, or about one-fourth of the total cultivated area, which, being held under privileged tenure, is altogether exempt from the land-tax; the tax on date trees, 9¾*d.* per tree, levied on about 5 millions; and licences on trades and professions at the average rate of £1 6*s.* 7*d.* per head; receipts from customs bring in about £600,000, and from railways about £880,000, while the octroi on tobacco is taken at about £500,000. The debt of Egypt amounts to about £70,000,000; of this sum the State debt is represented by nearly 57 millions, the remainder is the personal debt of the Khedive, raised on his own individual responsibility, and secured on his personal estate. A consolidated account of revenue and expenditure for the 10 years ending September 30th, 1873, published in 1874, showed a total revenue of £98,102,720, £26,949,000 from funded loans, and a total expenditure of £112,561,784; the deficit was met by an increase to the floating debt, since partly extinguished by a loan issued in 1873.

Great progress has been made in education during the last decade, as is amply illustrated by a report of the Minister of the Interior to the Khedive in 1873. The elementary and preparatory schools now muster about 90,000 children, and this number is still on the increase; in the era of Mahamad Ali the number did not exceed 3,000, but in the early years of the decade, ending 1873, had already increased to 60,000. The number of students at the higher colleges and schools was calculated in 1870 at 5,000, and has probably increased; such establishments are—(*a*) the

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polytechnic schools, which prepare both for the civil and military profession, the candidates for the former passing on through special administrative classes to the civil service of the State, those for the latter to the military academy; (*b*) the law schools; (*c*) the philological and mathematical schools; (*d*) the commercial school; (*e*) the medical school; (*f*) the military academy at Cairo; (*g*) the naval school at Alexandria. In proof of the present Sovereign's desire to spread and foster education, it may be mentioned that in 1872 he established in the immediate neighbourhood of his own palace at Cairo, a girls' school, in spite of the extremely inferior and subordinate position assigned to women by the *Koran*.

Prior to 1863, when the reigning Sovereign brought it under Government control, compensating the former proprietors, the postal system was in private hands; it is now organised on a European model, and extends as far as Massowah on the Red Sea.

The Suez Canal, commenced in 1859 and completed in 1869, though of immense benefit to the commerce of Europe, has not been a source of advantage to Egypt. Previously, passengers, mails, and goods, all passed by the Alexandria-Suez Railway, which, being the property of the Khedive, thus returned him a very large revenue. The canal has now absorbed so much of the traffic, that the railway returns but a very small surplus beyond the working expenses. A very large portion of the capital was subscribed by the Khedive, whose present financial embarrassments arise in great measure from the canal monopoly, and induced him, in the autumn of 1875, to offer for sale his 176,000 shares, which were bought for four millions sterling by the British Government, the Khedive undertaking to pay 5 per cent. interest on the capital for the nineteen succeeding years, during which the shares themselves bring in no interest.

Egyptian commerce, which is very extensive, though consisting in great part of goods carried in transit, has undoubtedly derived certain advantages from the Suez Canal, but England naturally extracts the greatest value. In 1874, the total number of vessels that passed through was 1,264, with a collective tonnage of 2,423,672, of which 69 and 71 per cent. respectively were British; the total receipts in that year from tolls alone were £994,375, and in 1875 amounted to £1,155,190.

The collective annual value of imports and exports averaged formerly 35 millions, of which England contributed about 70 per cent. The exports in 1873 to Great Britain were upwards of 14 millions, and the imports to Egypt upwards of 6 millions; but the export to Great Britain was, of course, greatly magnified by the costly transit trade from India

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and other parts of Asia, and this is declining rapidly since the opening of the canal, the exports and imports having fallen respectively in 1874 to £10,515,000 and £3,585,000. The average annual value of raw silk alone, which was reported at 4½ millions sterling from 1865 to 1871, has now fallen to £130,900; and raw cotton, again, formerly exported to an average annual value of about 8 millions, had fallen in 1874 to 7¼ millions. Cotton goods form the chief article of import to Egypt, the average annual value being about 4 millions, of which, however, the greater part passes only in transit.

III.—ARMY.

(1.) ORGANISATION.

The actual organisation of the Egyptian army dates from 1863, the year of Ismail's accession to the throne. Under his care the military frame-work, neglected, as already pointed out, by his predecessor, was gradually expanded, so that already, by the end of 1866, twelve infantry regiments were completed, a commencement made with cadres of five new regiments, and a cavalry, artillery, and engineer force, was in process of formation on the European model.

The Khedive exercises the supreme military command, and is vested with the right of appointment to all posts. The more immediate business, both operative and administrative, is centered in the War Department, the Minister of which exercises the chief control in all matters of administration, recruiting, armament, equipment, supply, and distribution.

A few years ago, a general Staff Department was organised, in connection with the War Department, by General Stone, an American officer. In 1869, it consisted of five officers only, of whom two were employed with the troops, the remainder in the head-quarter bureau. General Stone, who is chief of the general staff—the present constitution of which will be hereafter described—virtually commands the Egyptian army under the nominal authority of the Minister of War, and really under the close supervision of the Khedive. Besides the general staff, there is an artillery staff separate, and under the Minister of War.

The armed force of Egypt comprises—

1. The regular army with its reserves.
2. The irregular or local troops.
3. The gendarmerie.
4. The navy.

The regular army is composed of the "active troops" and the "reserve."

The periods of service with the colours are respectively five, seven, and twelve years for the infantry, cavalry, and artillery. On expiration of service with the colours, the soldier passes into the first reserve until the age of 35, after which he is enrolled in the second reserve for a further term of ten years.

The army is recruited by conscription. In theory, all subjects of the Khedive are liable, irrespective of rank or religion, the inhabitants of Alexandria and Cairo excepted, who are exempted by ancient privilege. Exemption by purchase is, however, permitted by law. The vacancies in the army should be filled up every year from men between 18 and 22 years of age; but the practice is irregular. When recruits are required to fill up the establishment, the numbers wanted are computed in the War Department, and then distributed among the different districts in proportion to population. The levy is conducted by the different district officials, who are the arbitrary judges of fitness for service, and who fatten on the bribes, with which all who have money purchase exemption. The more wealthy and influential classes and families, indeed, find no difficulty in obtaining exemption for their members even without so much as paying the prescribed fine, and the whole burden of military service thus falls on the poorer classes of the population,—a tax which presses heavily on them by the continual withdrawal from work of the younger members of their families. The exemption fine is not levied per recruit, but as a species of annual tax—*e.g.*, a family paying yearly 3 purses will have all its members exempted. After completing one year's service, the enrolled recruits may, moreover, free themselves from all further liability on payment of a certain fixed sum. The conscripts are collected at the chief town of their district, and, after examination by the Governors, are sent to Cairo, where they are distributed, in accordance with the orders of the War Department, to the various regiments and special arms.

The regular army has been recently organised in two army corps, and one reserve (the Guards) division in addition.

Each army corps consists of 2 divisions.
Each division comprises 2 brigades of infantry,
2 regiments of cavalry,
1 regiment of field artillery.

A brigade of infantry consists of 2 regiments, each of 4 battalions.

A regiment of cavalry consists of 5 squadrons, 1 being intended as a reserve squadron in war.

A regiment of artillery consists of 8 field and 2 horse batteries, all armed with Krupp guns.

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Thus the strength of a division is—

Infantry	16 battalions.
Cavalry	10 squadrons.
Artillery	10 batteries.

There is no corps of artillery or cavalry: all are divisional.

In addition to the above force there are three regiments of garrison artillery—one for service in Cairo and the Barrage, one for Alexandria, and one between Rosetta and Damietta. Of these, two-thirds of the men are also trained as field artillery men, so that in case of need additional field batteries could be formed, for which, it is stated, the guns are in store.

The irregular or local troops furnished by the desert tribes are, by some accounts, estimated at about 50,000 men, inclusive of two regiments, each of 3,000 blacks, from the Soudan, which last constitute a special reserve for the army. They constitute a kind of garrison service, and are utilised in guarding the towns and villages in the frontier districts against incursions of the nomad Bedouins—in protecting the canals, dams, and wells—in escorting the large caravans of pilgrims *en route* to Mecca—and in some places also, as town or country police, co-operating with the civil authorities in the levying of taxes, &c. Whether so large a force could be raised seems, however, extremely questionable. The gendarmerie corps of about 5,000 men is in peace given over to the service of the administrative authorities; this force is intended to form the nucleus of a reserve capable of rapid mobilisation, and might, from its organisation, be employed in field operations. In 1869, it consisted of only 2 battalions, one in Cairo, the other in Alexandria; it is now organised for 64 towns, and the Government proposes to make it into a *corps d'élite*, recruiting it only from the best elements of the commissioned and non-commissioned ranks of the army, who will receive on joining a step of promotion, while the rank and file will be more highly paid than in the regular forces.

The commissioned ranks of the Egyptian army comprise the grades of—

Lieutenant-General.
Major-General.
Colonel.
Lieutenant-Colonel.
Major.
Adjutant-Major.
Captain.
Staff Captain.
Lieutenant.
Sub-Lieutenant.
Ensign.

The officers are appointed almost invariably from the Military Academy;

only very exceptionally are they taken from the non-commissioned ranks. This academy, which is at Cairo, not only furnishes almost the whole body of officers, but also trains men for the general staff and accountant services. It comprises five separate courses, *viz.*:—

1. The general staff course.—The pupils are taken from the ranks of the army generally, irrespective of grade or arm. The number of students averages from 20 to 25. The programme of study comprises tactics and strategy, and other technical subjects of military science, mathematics, mechanics, topography, drawing, geography, and riding. The course is for four years.
2. The artillery and engineer course.—The pupils are taken from the best scholars of the civil preparatory schools. The number seems to be variable; formerly it apppears to have been limited to 90, of whom 60 were intended for the artillery, the remainder for the engineers. Later accounts give the numbers at 100 and 30 respectively. The course is nominally for four years, but, owing to the great want of officers, this has hitherto been reduced to three. The artillery pupils are formed into a battery, and furnish the commanding and duty *personnel* for its four 4-pounder guns; the teams are made up of mules. The engineer pupils are formed into a half company, which is commanded and instructed by a French officer.
3. The infantry course.—Boys are admitted between 14 and 16 years of age from the civil preparatory schools; the latest accounts state the number of pupils at 500 in place of 200, as originally proposed. They are formed into an infantry battalion. The programme comprises subjects of military science, mathematics, geography, history, drawing, gymnastics, fencing, and shooting.
4. The cavalry course constituted much as above, and with a very similar programme, but including riding, saddling, and putting on accoutrements, shoeing, and breaking, for which purpose 70 horses are attached. The number of pupils is stated to have risen from 64 to 100.
5. The accountant course.—The pupils are taken exclusively from the "Copts,"—that is to say, the Christian descendants of the ancient Egyptians, who have the monopoly in everything dealing with the accountant service, not only in the army, but throughout the whole country. It was originally intended for 30 students; the number now is uncertain. All the intendance officials are trained at this course; a large number are subsequently transferred to the Civil Service of the State, which then repays to the military chest the cost of the individual's instruction.

All the students and pupils are educated and maintained at Government cost, those of the general staff course receiving also rates of pay graduated according to the classes in which the pupils are distributed.

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This academy, it may be here mentioned, took the place of the former military school at Saidieh, the fortress at the Barrage, which admitted 150 pupils, who were all trained on the same model, and then appointed to the various arms according to their capabilities. The school was broken up in 1864, on the recommendation of the French military mission appointed to carry out the re-organisation of the army. The President of the mission became the first chief of the new academy.

Among the educational establishments for the army may be also mentioned the Veterinary and Agricultural School, which furnishes all veterinary officers and farriers.

For the purpose of supplying future material for good non-commissioned officers a school of "*enfants de troupe*" has lately been formed for soldiers' children in each division. The soldiers have the right of keeping their sons in these schools between the ages of 6 and 14.

The "Volunteer battalions" constitute another *quasi*-educational institution. These consist of young men from 16 to 21 years old, who enter these battalions to escape conscription. They are sons of men of all ranks, Pachas, Beys, and other military officers, &c., &c. They are taught the same subjects as the *enfants de troupe, viz.*, reading, writing, spelling, arithmetic, geometry, and English. They are dressed and live like soldiers, are commanded by officers and non-commissioned officers of the army, and live in barracks, but are allowed to go home on Friday, the Mahamadan Sunday. From these youths, when sufficiently educated and perfect in drill, are taken many officers of the army. Those who do not accept commissions pass into the reserve.

Virtually there are no promotion laws for officers, but since the year 1867 every Subaltern is required to pass an examination for promotion to the rank of Captain. According to ancient custom, a commission of officers is assembled annually in each regiment, previous to the fast of the Ramadan, and the most eligible officers selected by it for submission to the War Department. This method of procedure is observed for all ranks up to that of Colonel inclusive. Promotion to General's rank is made by the Khedive on the recommendation of the War Minister. In 1867, a regulation prescribed that every officer must serve two years in each grade before he can be promoted to the next higher.

The non-commissioned ranks comprise the grades of Sergeant-Major, Quarter-Master-Sergeant, Sergeant, Corporal, and Lance-Corporal; they are appointed from the rank and file according to individual fitness. Under recent regulations no soldier can be promoted to be a non-commissioned officer until he can read and write.

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The introduction of European institutions has externally produced a great change in the Egyptian army; it now more closely resembles the French, a result due to the "*Mission Militaire,*" which was brought over from France some years back, and has worked hard at the task of organisation on the French model: indeed, many of the most influential persons in the army are former French officers. The text books are translated from the French into Arabic, which is now the one official language of the army. Taking the army as a whole, however, the tactical training of the three arms, although lately improved, is still deficient: in the infantry, manual and platoon exercise, with parade movements and close formations, are made the essentials, and skirmishing and the utilisation of ground are almost entirely neglected; of the cavalry and artillery much the same may be said. Target practice has been lately introduced, and receives considerable attention. Considerable progress is reported to have been made of late, more especially since an order from the Khedive of 1869 substituted the Arabic in place of the Turkish language for official use. This has resulted in the appointment of Egyptian officers to many of the posts formerly held by Turks, who hitherto constituted almost exclusively the ruling class, and held in great part the upper posts under Government as well as in the army. The present Khedive is striving vigorously to replace the phlegmatic Turkish elements with the more enterprising and ambitious Arab.

The composition of the various arms and administrative branches is as follows:—

(2.) Infantry.

The infantry of the regular army consists, as has been mentioned, of 20 regiments of 4 battalions of 8 companies.

The staff and officers of a regiment comprise—1 Colonel, 1 Standard Bearer (also Adjutant), 1 Lieutenant-Colonel, 3 Majors, 3 Assistant Majors, 24 Captains, 24 Lieutenants, 24 Sub-Lieutenants, 24 Ensigns, and 3 Clerks; total 108, of whom 105 are combatants.

The paper strength of the company is 3 Officers, 1 Sergeant-Major, 1 Quarter-Master-Sergeant, 4 Sergeants, 8 Corporals, 3 Buglers. The numbers of the above ranks are invariable. The peace establishment of privates is 68: the war establishment is 88.

Prior to 1869, the infantry was armed with the Minié and short Enfield rifle. In September of that year the Remington was issued to some regiments. The whole of the infantry and rifles are now provided with the new weapon, and some 200,000 are reported to be in store.

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The dress of the infantry is very similar to that of the Turkish infantry. A short single-breasted tunic of dark blue, wide trousers of the same colour, tucked into half-boots, crimson fez with black tassel, brown cloth cloak with hood. In the rifles the colour of the tunic is grey; of the trousers, red. This dress is, however, only worn on grand occasions; the ordinary dress is a white linen jacket and trousers. The officer's dress is very similar to that of the men, only the tunic is longer, and the trousers are red and worn over the boots.

(3.) Cavalry.

The cavalry is composed of 10 regiments of 5 squadrons. The paper strength of the squadron is as follows, *viz.*, 1 Captain, 1 Lieutenant, 3 Sub-Lieutenants, 1 Sergeant-Major, 1 Quarter-Master-Sergeant, 8 Sergeants, 16 Corporals, 3 Trumpeters, 132 Privates, besides non-combatants; 173 horses. The peace effective in horses never exceeds 100 per squadron. The horses are mostly purchased by dealers in Syria, though some are brought from South Russia. The price given for the former is about £20; for the latter, which, though smaller and dearer, are preferred for their endurance and general better aptitude for cavalry service, from £20 to £27. The officers ride Arab horses. The cavalry are armed with Remington carbines and Colt's improved revolvers. The cavalry of the Guards division consists of 1 regiment of Lancers of the Guard, and 1 regiment of Dragoons of the Guard. In the other divisions the cavalry is composed of 1 regiment of Dragoons and 1 of Hussars.

The Bedouin tribes, which from their nomad life cannot be utilised as a recruiting material for the regular army, form irregular contingents of horse under their chiefs, providing their own armament, clothing, and horses. Some 10,000 might possibly be got together on an emergency in defence of the country, and would be useful for minor operations, outpost service, &c., but from their want of organisation and cohesion unfit for employment *en masse*.

(4.) Artillery.

There are 5 regiments of field artillery, each of 10 batteries of 6 guns; 8 of the batteries being foot batteries, the remaining 2 being horse batteries. The regiment thus furnishes 60, and the whole field artillery 300 guns. In the horse batteries the gun detachment is only in part mounted, the remainder being carried on the carriages and limbers.

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In 1869, the Egyptian field artillery adopted rifled guns, one regiment being furnished with 4-pounder muzzle-loading La Hitte's, the other partly with the same, partly with 12-pounder steel breech-loaders. At the present moment it is armed throughout with Krupp steel guns. A field battery is composed as follows, *viz.*, 1 Captain, 2 Lieutenants, 2 Sub-Lieutenants, 1 Sergeant-Major, 1 Quarter-Master-Sergeant, 12 Sergeants, 15 Corporals, 3 Trumpeters, 114 Gunners and Drivers, besides non-combatants; 114 horses.

Of the three regiments of garrison artillery, the first garrisons the works of the fortress of Saidieh at the head of the Nile delta, the second garrisons the citadel of Alexandria and the adjoining forts and works; the third is distributed among the forts of Rosetta, Bourlos, and Damietta. A regiment of garrison artillery has 4 battalions, each of 4 companies. A company has the same *personnel* in officers and men as a field battery. The coast armament is principally of Armstrong rifled guns.

(5.) ENGINEERS.

The organisation requires one battalion of engineers for each division of the army. Each battalion, when complete, should be composed of 6 companies of sappers and miners and 2 companies of *pontonniers*. The engineer battalions, however, are only in course of formation. The *personnel* of the existing engineer force is employed during peace in the construction of forts and railways, and in working the stone quarries.

(6.) TRAIN.

No provision for a train exists, nor are the regiments furnished even with pack animals as in Turkey. In peace, baggage or stores are forwarded by ship or rail, when such transport is available; otherwise pack animals and camels are hired. Almost all the towns of Egypt are, however, connected by a railway or water line. In war, pack animals would be requisitioned to the extent required.

(7.) SANITARY SERVICE.

As regards sanitary service, every regiment has in peace 3 surgeons and a field surgery: the sick are at once placed in rooms apart from the rest of the men, and within twenty-four hours admitted to the hospitals. There is only one military hospital, namely, at Ramleh, near Alexandria: it can accommodate 400 patients, and is under the presidency of the chief of the sanitary department; otherwise the soldiers are admitted to the civil institutions, which are said to be admirably conducted. The chief

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town in each province has one such, with room for from 300 to 500 persons; the medical staff is well paid and answers all requirements. In the field, regimental hospitals would be formed, but no detailed instructions appear to be prepared for their equipment, &c., and it is therefore probable that there would be a great want of *personnel* and *matériel*. During the Crimean war, however, every regiment had a field hospital for 200 men; later, during the hostilities in Crete, there was only one such for every two regiments.

(8.) TECHNICAL ESTABLISHMENTS.

The technical establishments and workshops for the manufacture of arms and *matériel*, articles of equipment, accoutrements, &c., are all in or about Cairo; the principal ones are—

(*a*) The powder-mills, capable of supplying all requirements in powder for the army; the country is rich in sulphur, saltpetre, and wood.
(*b*) The gun foundry at Boulak.
(*c*) The small-arm factory, supplying the carbines, cartridge cases, and side-arms: the rifles are imported.
(*d*) The artillery carriage factory at Boulak.
(*e*) The clothing and equipment factory at Cairo, which furnishes all stores of clothing and equipment, saddlery, harness, tents, and shoes: it employs some 600 workmen.
(*f*) The arsenal at Cairo, containing the stores of arms of all kinds, cannon, &c.

Six companies of from 120 to 150 workmen are employed, one at the arsenal, one at the gun foundry, and four at the clothing factory.

The barracks are said to be exceedingly good.

(9.) PAY AND ALLOWANCES.

The pay of officers and men is the same in all arms: that of the officers has of late years been reduced by one-fourth, but it still exceeds the rate of pay in the Turkish army; the pay of the non-commissioned officers and men, on the other hand, is inferior to that of the corresponding ranks in Turkey, but this may be attributed to the extreme cheapness of all articles of food, and the small requirements of the Egyptian in comparison with those of the European. The regimental officers, *i. e.*, captains and subalterns, receive free rations and clothing. The ration of the private soldier forms the normal unit, the captain being rated at 3 normal ration units, the subaltern at 2; the value of the ration is estimated at about one pound sterling per month. It consists of about 2 ℔. of bread, $\frac{1}{3}$ ℔. of meat, and $\frac{1}{4}$ ℔. of rice, or other vegetable, confectionary, &c. Two hot meals are supplied. Both pay and allowances are punctually issued; the rations are good in quality and the supply well organised; the corruption and irregularity so prevalent in Turkish administration is seldom met with in Egypt. The monthly rate of pay is approximately as follows:—

	£	s.	d.
War Minister	160	0	0
Divisional General	60	0	0
Brigade General	48	0	0
Colonel	32	0	0
Lieutenant-Colonel	20	0	0
Major	16	0	0
Vice-Major	9	0	0
Captain	4	10	0
Staff-Captain	2	10	0
Lieutenant	2	10	0
Sub-Lieutenant	2	5	0
Ensign	2	0	0
Sergeant-Major	1	2	0
Sergeant	0	7	6
Corporal	0	6	0
Lance-Corporal	0	4	6
Private	0	3	0

The local troops receive a far higher rate of pay than the above, but with this they have to provide their own clothing, armament, and equipment, as well as food. The private soldier gets about a pound a month.

For distinguished service or other special merit, the General and other superior officers receive presents in money or in kind from the Khedive, on the recommendation of the War Minister; the regimental commanders have lands or houses bestowed on them.

(10.) Pensions.

The pensions of officers are divided into five classes, *viz.*:—

After 15 years' service	¼ of rate of pay.
„ 20 „ „	⅓ „ „
„ 25 „ „	½ „ „
„ 30 „ „	⅔ „ „
„ 40 „ „	full pay.

Widows of officers receive one-half of the above rate of pension; orphan daughters the same up to the time of their marriage; orphan sons the same up to 15 years of age.

There is no pension for the non-commissioned officers and men, but the wounded and veteran soldiers of the time of Mahamad Ali are granted special money allowances from the State on account of the meritorious services rendered in that era.

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(11.) Discipline.

Minor offences are punished by imprisonment or corporal punishment; independent commanders have the power of sentencing to 50 lashes. More serious crime is tried by a regimental commission, whose sentence, however, requires the confirmation of the 1st section (military justice) of the 1st sub-department of the War Department. The law provides that sentence of death is only to be carried out in time of war, and then only for desertion or high treason. Officers may be reduced to the ranks.

(12.)—The General Staff.

The general staff, which is a new creation, is under the War Minister direct, from whom nominally the Chief of the Staff takes his orders. This Chief of the Staff is General Stone, an American officer.

The general staff is divided into six sections.

Section 1.

Discipline, orders for movement of troops, promotions, and studies of mobilisation.

Section 2.

Military Art and History.

This section is charged with the preparation of accounts of campaigns, the study of military art and history, correspondence concerning military schools. It edits a small magazine, which is published monthly in Arabic, and circulated among the troops, at the rate of two per company. This magazine generally contains about five articles—the first, a summary of the military news of the month; the others on subjects of special interest to infantry, cavalry, artillery, and engineers respectively.

The War Department library is in charge of this section.

Section 3.

Geography, Reconnaissance, Railways and Telegraphs.

The survey of Egypt, the preparation of maps, the conduct of reconnaissances, and the military duties connected with the railways and telegraphs, are in charge of this section. By it are directed the military surveys now being made on the Upper Nile, at Darfur, on the coast of the Gulf of Aden, &c.

Section 4.

Inspections, Military Law, and Secret Service in time of War.

Section 5.

Organisation and Administration.

The duties of this section seem to be chiefly to conduct correspondence with the Intendance, which is separate, and directly under the War Minister.

Section 6.

Coast Defences.

The study of coast defence, the questions connected with the forts and their armaments, torpedoes, and improvements in artillery, are dealt with by this section.

In the field, the sixth section has, of course, no place; but the duties of the other five are continued under the Chief of the Staff of the army in the field.

Section 1 has to do with discipline and orders.

Section 2 is charged with preparing the diary of the campaign (corresponding to our Q. M. G.'s journal).

Section 3 is charged with reconnaissance.

Section 4 is charged with inspection, and a Judge Advocate is attached to it.

Section 5. The Intendent of the army takes his place on the general staff as head of this section in the field.

The general staff of the army now contains 115 officers of grades from Colonel to Sub-Lieutenant. The general staff is recruited from the staff school, whence the pupils come out with the grade of Sub-Lieutenant. They pass one year in the staff bureau, and then go out either in expeditions or to serve in regiments for at least a year, when, if favourably reported on, they return to staff duty.

The different military commands have the sections represented according to the importance of the command. In army corps one or more officers are attached to each section. In lower commands, one officer may perform the duties of two or more sections.

There are two companies of non-commissioned officers and men belonging to the general staff. They do duties as orderlies to the staff, &c., and accompany staff officers on the numerous exploring expeditions sent into the hitherto unsurveyed portions of Egyptian territory.

(13.) GENERAL REMARKS.

The value of Egyptian troops in the field may, at a period not very remote, become a question of some importance for England. The expe-

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rience of the late Abyssinian campaign is not in favour of the quality of the Egyptian troops.

The fellahs from whom the army is recruited have been ground down by centuries of oppression; they are very patient, submissive, and sober; but although military discipline seems to inspire them with a smartness and spirit they do not otherwise possess, yet at the best the Arab fellah is a broken-spirited creature. It is not to be forgotten that the officers are taken from exactly the same class as the privates. The officers are doubtless the most intelligent and in every way the cream of their class, but they are after all *fellahs ;* and it is more than doubtful if the soldiers would follow their officers freely if called upon to fight in the open field.

To impart to the Egyptian army a fighting value, it would have to be officered largely, if not entirely, by Europeans, whom the fellahs have been accustomed to regard as a superior race.

IV.—NAVY.

The navy has been entirely restored and refitted by the present Khedive. During the reign of Said nothing had been done to repair the disaster of Sinope, and at Ismail's accession the Egyptian fleet was represented by only four vessels with scarcely 600 sailors. At the present moment it comprises some 50 fighting vessels of all kinds, carrying about 500 guns (of which 7 ships of the line, 6 frigates, 9 corvettes, 7 brigs, and 18 gun-boats), besides 27 transports. Her three iron-clads—*Nedshim-i-Shefket, Assa-i Shefket,* and *Djelaj,* constructed in Europe—had to be handed over to the Porte in 1870. Two monitors, however, now lie in the Bay of Aboukir, and arrangements have been made for a rapid acquirement of armoured ships in case of need.

The fleet is manned by conscription among the coast population: the officers are trained at the naval school at Alexandria, which admits from 25 to 35 students.

The principal naval arsenal and dockyard is at Alexandria, a strongly fortified place, and the chief military and commercial harbour in Egypt. It has a large floating dock, 150 metres in length, and 30 metres wide, capable of taking in the largest ships, and purchased from the French Government for £140,000. Suez has also a fine, well built and arranged dry dock, 140 metres long and 30 wide, with a depth of nearly 12.

In case of need, moreover, the Egyptian Government has at hand the material of the Postal Steam Ship Company, which comprises 64 vessels, 9 of which in the Red Sea have a collective horse-power of 1,240, and tonnage of upwards of 7,000; 16 in the Mediterranean with a horse-power of 2,697, and tonnage of upwards of 11,000; and 39 on the Nile with 2,470 horse-power (tonnage is unknown): both officers and men belong to the Egyptian navy. This Company maintains regular communication between the seaports of the Red Sea, in the Mediterranean, between Constantinople and Alexandria, along the coast of Syria, and between the principal points of the Greek Archipelago.

The navy is administered by the Marine Ministry, the Minister being assisted by a Director and an adequate staff of subordinates.

V.—SKETCH OF FRENCH AND ENGLISH OPERATIONS, 1798-1801.

These notes are taken from General Bertrand's *Campagnes d'Egypt et de Syrie*, and Wilson's *History of the British Expedition to Egypt*.

Napoleon's Conquest of Lower Egypt, July 1st–23rd, 1798.

The French army under Napoleon, destined to destroy the Mameluke power in Egypt, and to inflict a mortal blow on England, disembarked at Marabout Point on July 1st, 1798, the very day of the arrival of the squadron.

Capture of Alexandria, July 2nd.

On the following day Alexandria was taken by storm.

Immediately after the capture, Napoleon addressed the Pacha at Cairo as follows:—

Napoleon's Address to the Pacha at Cairo.

"The French Government has repeatedly asked of the Sublime Porte the chastisement of the Beys and the suppression of the outrages committed by them in Egypt; the Sublime Porte has declared the Mamelukes a greedy, capricious people, undeserving of its Imperial protection. The French Government sends now a powerful army to suppress the brigandage of the Beys, which it has already done in Algiers and Tunis. Come and help me."

Composition of French Army.

The army comprised five divisions, under Desaix, Regnier, Bon, Dugua, and Vial, a reserve under Murat, two brigades of dismounted cavalry, with 42 guns; in all about 21,000 men.

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Advance on Cairo.

The advance on Cairo was to be made on two lines; on the right, the main body, consisting of four divisions, under the immediate orders of the General-in-Chief, would follow the Alexandria Canal by Damanhour and strike the Nile at Ramanieh: on the left, General Dugua, with his division and the dismounted cavalry, would, after seizing Fort St. Julien and Rosetta, ascend the Nile and unite with the main army at Ramanieh.

Desaix left Alexandria on the 4th, and reached Damanhour (about 45 miles) on the 6th. Regnier followed on the 5th, Bon on the morning of the 6th, and Vial on the morning of the 7th. Napoleon, with the reserve under Murat, left on the evening of the 7th.

General Kleber, with about 6,500 soldiers, or including the marines of the fleet, from 9,000 to 10,000 men, was left behind in command at Alexandria.

On the 6th General Dugua seized Fort St. Julien and occupied Rosetta. The dismounted cavalry were embarked in barges, with their equipment, supplies, and stores of ammunition, &c., and on the 9th the flotilla commenced to ascend the Nile under the convoy of Rear-Admiral Perrée. General Dugua moved forward the same day by the left bank.

General Menon, wounded at the capture of Alexandria, remained behind with some 1,200 men, in command of Rosetta and St. Julien.

The main body reached Ramanieh on the 10th; the flotilla and Dugua's division arrived on the 12th. A fort for 300 men and 2 guns was thrown up. The French were molested in flank and rear by Bedouins, and the progress by the rivers was impeded by the Mameluke flotilla.

Meanwhile, Murad Bey, hearing of the capture of Alexandria and Rosetta, and of the French advance, left Cairo on the 6th with 3,000 Mamelukes, 2,000 Janissaries, and some 60 boats. Ibrahim Bey followed with a still larger force. On reaching Shibraghite, some seven or eight miles above Ramanieh, Murad Bey took up a position, entrenching the village and throwing up batteries.

Engagement at Shibraghite, July 13th.

The French advanced on the evening of the 12th to Miniéh, about three miles above Ramanieh, and on the morning of the 13th found themselves quickly in front of the Mameluke army. The victory was complete, and pushing steadily on, Napoleon encamped the same evening at Shabour, having marched over 20 miles independently of the fatigues of the battle. The two brigades of dismounted cavalry had been disembarked, and now moved by the right bank of the river.

On the evening of the 14th, the army camped at Comscherif, on the 15th at Alkam, 10½ miles, on the 16th at Abou Nechabeh, 13½ miles, on the 17th at Verdam. Omm-devian, at the foot of the Delta, some 15 miles below Cairo, was reached on the 19th, and the army halted on the 20th to prepare for the impending battle.

The Mameluke army had taken up a position on the left bank of the Nile, opposite Cairo, extending between Embabeh and the Pyramids; strong in infantry, cavalry, and artillery, it was also supported by numerous flotilla of boats of every description. The French squadron had been arrested by the low water.

Battle of the Pyramids, July 21st.

On the 21st the French advanced, and found the enemy with their right resting on the entrenched camp about Embabeh opposite Boulak, and their left on the Pyramids, a front of some 15 miles; some 20,000 Janissaries formed the right; in the centre were the mounted Mamelukes, numbering about 12,000; on the left, Bedouin Arabs, mounted and foot, in number estimated at 8,000. The river was almost blocked up by the fleet of boats. In the battle which ensued, known as the battle of the Pyramids, the French victory was decisive. Murad Bey ordered the flotilla to be fired, and at nightfall the whole army was dispersed.

Entry into Cairo, July 23rd.

The French army entered Cairo on the 23rd; thus in 23 days, from July 1st to 23rd, the whole of Lower Egypt, with the capital, was conquered. Napoleon entered Cairo on the 25th.

Murad Bey now busied himself in reorganising his forces in Upper Egypt, while Ibrahim, who had retired to Belbeis, strove to raise fresh levies throughout Lower Egypt.

Operations towards the N. E., against Ibrahim Bey, August 2nd to 15th.

On August 2nd Napoleon detached a force under General Leclerc to El Kanka, about 18 miles from Cairo, on the Belbeis road, to more closely observe Ibrahim's movements; Murat was sent to Kelioubich, and Regnier to La Coubbé in support.

On the 5th Ibrahim advanced on El Kanka, where he found the French advance-guard, which he attacked, but Murat and Regnier hurrying up at the sound of the firing, turned the scale against the Mamelukes, who had in the first instance gained some advantage, and Ibrahim was driven back on Belbeis.

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Napoleon handed over the command at Cairo to Desaix, and took the field in person; halting on the 7th at El Kanka, he reached Belbeis on the 8th. Ibrahim had retired to Salheyeh, some 90 miles distant from Cairo. On the 9th Napoleon pushed on to Koraim, and the next day to Salheyeh. After a slight skirmish, Ibrahim, who had been taken by surprise, fell back to the desert. Passing Katieh, he reached El Arish, and entered Syria. The arid desert commences at Salheyeh; Napoleon, therefore, arrested his pursuit, and establishing a fort and leaving some troops in occupation, he returned to Cairo, which he re-entered on the 15th.

Operations against Damietta, August.

Dugua, who had been directed to move on Damietta, second only in rank to Cairo, seized it on the 12th, and also occupied Lake Menzaleh, and the castle of Tineh. Batteries were erected at Damietta.

Battle of the Nile, August 1st.

Meanwhile information arrived on the 12th of the battle of the Nile, fought on the 1st, in which the French squadron at Aboukir was destroyed by Nelson.

Operations on Suez, November.

Shortly afterwards the Porte joined the coalition against France, and declared war; towards the end of October an insurrection broke out in Cairo, and threats of attack from the direction of Suez induced Napoleon to detach a force to seize this important place. On November 8th, General Bon marched with his division, and entered Suez without obstruction on the 10th. The General-in-Chief left Cairo for the same place on December 24th, and arrived on the night of the 26th, returning to Cairo on January 8th, 1799.

Operations for the Conquest of Upper Egypt, August 1798—June 1799.

After the flight of Ibrahim, Napoleon had at once taken steps towards the conquest of Upper Egypt, and charged the task to Desaix, who marched from Cairo on the 25th August, having with him some 5,000 men, supported by the reserve under Murat.

This may be summarised as occupying five months. Ascending the Nile, he fought the battle of Sédemair on October 7th, in which he completely defeated Murad Bey, and became master of the provinces of Beni-Soneif and Tamin. On the 3rd and 8th January 1799, were fought the battles of Saouaki and Tahtah, which resulted in the subjection of the provinces of Miniéh, Siout, and Girget. On February 2nd he had conquered Syéne, and with this the whole of Egypt. Five more months

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were occupied in suppressing insurrections and consolidating his successes. Finally, on May 29th, Cosseir on the Red Sea was taken by a detached force under General Belleaid, which struck off from the Nile at Coptos, a few miles above Keneh.

Napoleon's Expedition to Syria, 1799.

During the period of Desaix's conquest of Upper Egypt, Napoleon's attention had been directed to Syria. The Porte had collected two considerable armies,—one in Syria, destined to traverse the desert from Gaza to Salheyeh, and thence march on Cairo; the other in Rhodes, intended to disembark at Damietta or Aboukir. The operations of both armies would be supported by the Mamelukes and Arabs. Napoleon decided to take the offensive against the army in Syria, and being preceded by a portion of his army, himself left Cairo on February 9th, 1799. The effective of the French army on January 1st, 1799, is given at 29,700 men, *viz.*:—

Upper Egypt	6,500
Lower Egypt	10,000
Syria	13,150

The results may be briefly summarised as follows:—Of the two Turkish armies, that in Syria was almost destroyed; and of that collected in Rhodes, a great portion fell at St. Jean d'Acre.

Return to Cairo, June 14th, 1799.

On June 14th Napoleon made his re-entry into Cairo, at the head of his victorious army returned from Syria. The whole of Egypt was tranquil.

Operations of the Turkish Expedition, July 1799.

That part of the Turkish army collected in Rhodes which had not fallen at St. Jean d'Acre, had meanwhile been embarked in an Anglo-Turco squadron, under Sir Sydney Smith, and directed to Aboukir.

Landing at, and capture of, Aboukir Fort, July 14th and 16th.

The squadron arrived on the 12th July 1799; the troops were disembarked on the 14th, and on the 16th Aboukir Fort was captured.

Napoleon heard of the presence of this expedition on the 15th, and at once sent orders in every direction to concentrate on Ramanieh. Desaix was to evacuate Upper Egypt, and march on Cairo; Regnier, at Belbeis, to move on Ramanieh; Kleber, at Damietta, was directed to the same point; the Cairo garrison, including the divisions Lannes and Bor, the same; 23,000 men and 60 guns would be collected at Ramanieh. Dugua was left in command at Cairo. On July 19th the head-quarter camp reached the rendezvous, having covered 102 miles in three days.

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Defeat of Turkish Army by Napoleon, near Birket, July 25th.

On the 25th the French army advanced and attacked the Turkish field force, which had not pushed far beyond Birket. The rout was complete, and on August 2nd the fort at Aboukir was evacuated.

Return of Napoleon to Europe.

Egypt was now threatened at no one point. The Mamelukes had been in great measure broken up and suppressed; the Turkish armies had been destroyed; but though the French army numbered some 28,000 men, of whom about 24,000 were fit for duty, affairs in Europe rendered any further conquests impossible. Napoleon therefore returned to France, leaving Kleber in command.

Convention of El Arish, January 1800.

The Convention of El Arisch, which had for its basis the capitulation of the French army and the evacuation of Egypt, was brought about by the English Government in accord with the Porte. The provisions having been agreed to by General Kleber, it was signed on January 24th, 1800, and ratified by the representative of the British Government, Sir Sydney Smith, the French Commander, and the Grand Vizier.

Its Failure.

During the carrying out of the articles, however, additional terms, of a degrading nature to the honour of the French army, were imposed, which led to its failure in March. The convention had so far been executed that at this time the gates of the desert, with the forts of Katieh, Salheyeh, Belbeis, Lesbé, and Suez, as well as the whole of Upper Egypt, and the right bank of the Nile following the Damietta branch, had been handed over to the Turks; part of the French army had already moved down to Rosetta and Damietta; the works at Gaza and Cairo had been disarmed; the capital had been given over to the government of one of the Grand Vizier's Pachas. Hostilities were at once ordered to be resumed; the troops on their way to the coast were ordered back; those already embarked, disembarked; the citadel of Cairo and the works of Gaza re-armed. Kleber had about 15,000 men in the field, besides 9,000 in Cairo and the Delta.

Renewal of hostilities, March 1800.

The Grand Vizier's army was estimated at about 60,000 men, of whom 15,000 were detached to Belbeis, Salheyeh, Damietta, and Upper Egypt, leaving 45,000 to form the field army; this number included some 20,000 Bedouins. He proposed to forestall the French at Cairo.

Defeat of the Grand Vizier at the battle of Heliopolis, and flight to Gaza, March 19th.

On the 18th March, however, Kleber marched from La Coubbé, where he had assembled his troops, to Matarieh ; he attacked the Grand Vizier here, and routed him at the battle known as the battle of Heliopolis.

In spite of the insurrection which broke out the same day at Cairo, Kleber pursued on the 20th to Belbeis, which surrendered after a short cannonade; then to Salheyeh, where the Grand Vizier abandoned his camp and baggage; the latter did not indeed arrest his flight till he reached Gaza, having with him only about 5,000 men of his original force.

During these operations Murad Bey had remained neutral, while shortly afterwards he even gave in his submission to the French Commander, and engaged to furnish a corps of Mamelukes to fight on the French side against the Turks.

Re-occupation by the French of Damietta, &c.

From Salheyeh, Kleber detached a force under Belliard on Damietta, which defeated the Turkish division at Chourah, and then entered Leste without opposition.

Siege of Cairo by Kleber.—Captured April 25th.

On March 20th Kleber returned to Cairo, which had meanwhile been watched by a brigade under Lagrange, detached by Kleber on hearing of the insurrection. Cairo was at once laid siege to, and on April 25th it capitulated. The General-in-Chief now directed all his attention to the strengthening of his position at Cairo and other points of the Delta. His assassination on June 14th gave the chief command over to General Menou, who busied himself during the autumn and winter in consolidating his position and in administering the government.

On the 11th March 1801, Menou at Cairo learnt of the arrival of the British expedition. Leaving 6,000 men behind at Cairo, in Upper Egypt, and at Belbeis, Salheyeh, Suez, Rosetta, and Lesbé, he marched on the 12th, and arrived on the 19th before Alexandria. Including the troops he had brought with him, he had concentrated a force of about 12,000 men and 50 guns.

Abercrombie's Expedition, March 1801.

The British expedition under Abercrombie effected its landing in presence of the French troops at Aboukir Bay on March 8th, 1801, with an effective field strength of about 12,000 men.

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Action in front of Alexandria, March 21st.

On March 13th the French were driven within their lines on the heights before Alexandria, and on the 21st was fought the action near Alexandria, by which the French army, under General Menou, was blockaded in the town.

In this action Abercrombie was mortally wounded, and the chief command devolved on General Hutchinson.

Steps were at once taken to secure the mouth of the Nile, commanded by Rosetta and the adjoining fort of St. Julien. A detached force of British and Turks was despatched under Colonel Spencer; this officer left the army before Alexandria on April 2nd for Aboukir, where he joined the Turks, and passing the two ferries, and keeping his right on Lake Edko, reached the place of the same name on the 7th, and arrived at Rosetta on the 8th, after a painful march across the desert.

Capture of Rosetta and Fort St. Julien, April 19th.

The French retired to El Hamed, a strong position to the south of the town of Rosetta, resting its left on the lake and its right on the Nile, and abandoned the town to the allied force.

Spencer encamped his troops in front of El Hamed, the French withdrawing up the Nile. On the 19th the castle of St. Julien capitulated.

Advance on Cairo, May 4th.

The march on Cairo commenced on May 4th, when a detachment of British troops, about 1,200 strong, with the 4,000 Turks of the Captain Pacha, the whole under Colonel Stewart, crossed the Nile from the camp of El Hamed, and took post at the canal of Birimbal. Stewart then formed the left column in the advance, while the main body, under General Hutchinson in person, about 3,200 British troops, moved up the left river bank.

The army in front of Alexandria was left under General Coote.

On May 6th Stewart halted between Sindion and Fona, Hutchinson at Deroute.

Position at El Aft (Atfeh).

On the 7th the position of El Aft on the left bank, evacuated the previous night by the French, was entered by the main body. This position consisted of a canal, easy of access, however, at every point, the left resting on swamps practicable for cavalry and light guns, the right on the wide elbow here formed by the Nile, which enabled both front and rear to be enfiladed from the right bank; the position became untenable,

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therefore, as soon as Stewart's batteries could get into position. Stewart halted on this day at Serafa.

Position at Ramanieh.—Action of Ramanieh, May 9th and 10th.

On the 9th Hutchinson moved on Ramanieh, Stewart on Dousong. At Ramanieh a fort had been built, and the French were found in position. The canal of Alexandria commences at Ramanieh, and after running for about 300 yards parallel with the river, turns off at right angles to the west, in the direction of the village of Mehallet Daout; from the shoulder angle to this village it presents a good line of defence, the left being covered by the boggy bed of a rivulet, the Canopie branch of the Nile, which runs almost at right angles from the canal to Lake Edko; its maintenance secures retreat on Alexandria. General Lagrange, commanding the French, did not, however, occupy it, but took up a position having its right on the shoulder angle, and its left on the town of Ramanieh, with the centre resting on the fort, which was surrounded by much swamp land; thus right, centre, and left were on the banks of the river, here only about 100 yards wide, and the whole was covered by the line of the canal parallel with the river. The action continued during the 9th and early part of the 10th, when the fort with its garrison was surrendered, and the French withdrew up the river.

Results of action.

The value of this success was very great. The two French armies, of Alexandria under Menou, and Cairo under Belliard, were now divided by a vast extent of desert, and combined offensive operations were thus rendered impossible; the command of the Nile was secured, and communication was established with the interior of Egypt.

On the 11th the army advanced again. The main column halted at Shibraghite, about ten miles from Ramanieh, the left column between Saafie and Mehallet Dye.

On the 12th the main body moved to Kafr Houdieg, left column to a position on the canal of Ferasiak.

On the 14th Hutchinson marched to between Shabour and Kafr Laheesse, Stewart to Benoufar.

On the 15th respectively to between Zowaff and Zaout-el-Bahar and Lacra.

On the 16th respectively to Algam and Nadir.

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Communications opened between the British Force and the Grand Vizier, and action at El Kanka, May 16th.

Meanwhile communication had been opened with the Turkish field army under the Grand Vizier, by courier leaving General Hutchinson's head-quarters on the 13th, who reached the Turkish camp on the 15th. Ascertaining that the French were advancing from Cairo on the road to Belbeis, and had already passed El Kanka in his front, the Grand Vizier determined, in spite of the advice sent him not to risk an action, to engage, and on the 16th the battle was fought at El Kanka, General Belliard being completely defeated.

On the 18th Stewart moved to Menouf, following the Menouf canal, which leaves the Nile at Nadir, rejoining it about 20 miles below Cairo. He was directed to place himself under the orders of the Grand Vizier, who, after the battle of El Kanka, was moving north on Benha on the Damietta branch of the Nile.

On the 21st Stewart reached Birchamps, where he took up an encampment till June 4th.

On the 23rd General Hutchinson proceeded ahead, to meet and hold a conference with the Grand Vizier, whom he reached on the 24th, and left again for his own head-quarters on the 27th, having meanwhile arranged the plan of further operations.

On June 1st the main body advanced to Mischlei.

On June 2nd the Mamelukes, under Osman Bey (Murad had died, and Osman succeeded him), who had not previously avowed their open allegiance, and whose co-operation was therefore questionable, joined the British camp.

During the delay orders had been sent to Rosetta to hasten the forwarding of the heavy artillery for the siege of Cairo, thought to be now impending.

On June 4th the main body moved forward to around Lochmas, while Stewart crossed the canal, and encamped again on the banks of the Nile.

On the 5th Hutchinson to Verdam, about 10 miles; Stewart to Shubra Shaabi, where he joined the Grand Vizier.

On the 7th the army marched to Erkoue, where the Nile divides into two branches.

On the 9th Hutchinson moved on to Burtos, the Grand Vizier to Charlahan.

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March of Lloyd's Detachment from Suez.

On the 10th a small reinforcement of British troops, numbering about 210 men, under Colonel Lloyd, reached the expedition from Suez. This detachment had been disembarked from Admiral Blanket's squadron, destined for the attack of Suez, which place, however, was found to be evacuated by the French on the arrival of the British ships. Leaving Suez on the 7th, Colonel Lloyd marched 70 miles in a little over three days, the first 40 miles in a direction N. N. W. over a hard sand; the last 30 in a direction N. W. by W., of which the first ten over a hilly country, and the remainder over a very deep, heavy sand. No man tasted food after leaving Suez, and the three pints of water carried per man was in great part spoilt. Only eight men were absolutely lost. Camels formed the transport.

On the 16th Hutchinson marched on to Finesh, the Grand Vizier to Bessous.

On the 16th the army moved to opposite Shubra, the British, under Stewart, occupying the canal in front of the place; the Grand Vizier remained at Bessous. A bridge of boats was here thrown across the river, under cover of the British line, and was completed on the 19th.

Meanwhile a reconnaissance was made towards Gaza, on the north front of Cairo, where a bridge of boats connects with Old Cairo, on the right bank.

On the 20th, previous orders to advance were countermanded, but the Turks could not be held back, and on the evening of that day the line of canal between Elwoile and Elmini was occupied.

On the 21st the British troops moved up to within a mile and a half of Gaza, encamping in two lines, and resting their left on Dockee, their right on Laneen; the Turks threw forward their right to Tahournis, and also encamped in two lines. The Mamelukes took post in rear, with the exception of a cavalry detachment, sent forward to reconnoitre, which was advanced to the village of Sachal Michle, close to Gaza.

On the 22nd General Belliard proposed a conference to consider terms of capitulation.

On the 23rd a 48 hours' cessation of hostilities was agreed upon.

Capitulation of Cairo, June 27th.

On the 27th the capitulation was signed.

Return of British and French Troops to Rosetta.

On July 15th the French finally evacuated Gaza, and with the allied army under General Moore, marched for Rosetta, which was reached on the 28th.

The embarkation of the French army commenced on July 31st, and continued for ten days, the grand total of men shipped being 13,754.

Baird's Operations with the Indian Army.

Though General Baird's Indian army took no part in the taking of Cairo, his co-operation in the expedition requires notice. He had left India towards the end of December 1800, his destination being Suez, which, however, the force of the monsoon prevented his reaching; in the Red Sea he was to be joined by a small force from the Cape. Learning at Jedda, from Admiral Blanket, of the action before Alexandria of March 21st, and the subsequent advance on Cairo, and anxious to co-operate in some measure with the operations of General Hutchinson, he determined to land at Cosseir, and brave the difficulties of the desert, in the hope of being in time to afford his support.

His march from Cosseir to Kunieh.

He reached Cosseir June 8th, and managing to collect 5,000 camels, made preparations for enabling his army to cross the desert. Pushing forward with one division of his force, he arrived at Cunei (Keneh) on June 30th, and carefully arranged the necessary disposition for the march of the remaining divisions, establishing posts at the existing wells, and causing fresh ones to be dug. The Cape force landed at Cosseir on July 10th, and marched for Keneh on the 20th, reaching it on the 29th. The whole of the army was assembled at Keneh at the end of July, and comprised about 5,220 rank and file, or inclusive of all ranks and attendants, about 7,500 men. The march from Cosseir to Keneh is thus described :—

Cosseir to new wells	11	miles.	Water.
Half way to Moilah	17	„	No water.
Moilah	17	„	Provisions and water.
Advanced wells	9	„	Water.
Half way to Legaitta (El Egaytah)	19	„	No water.
Legaitta (El Egaytah)	19	„	Provisions and water.
Barimba (Bir Ambeh)	18	„	Water.
Keneh	10	„	Nile.
	120		

This total of 120 miles was, however, considered to be under-estimated. The three days' march to Moilah were through the bed of a ravine showing signs of water having flowed through it. From Moilah to Bir Ambeh the desert consisted of a very hard, gravelly soil, covering an uneven country. The route still lay through ravines, which, however, presented no appearance of water having flowed through them. No hut or sign of habitation was met with before reaching Bir Ambeh. At Moilah and El Egaytah General Baird had established posts of provisions; the well, with the exception of two or three old Arab posts, were dug by the sepoys; they were not deep; the soil was clayish; the water brackish. After being drunk dry, they were reported to fill up again in 12 hours.

The news of Baird's arrival at Keneh was received by Hutchinson on July 16th, who at once ordered him up to Cairo. From Keneh to Cairo, a distance of about 500 miles, the troops were forwarded in dgerms (barges), the time occupied being ten days.

Return of British Commander to Rosetta.

Leaving a small British detachment with the Turks and Mamelukes in and about Cairo, General Hutchinson, after securing supplies for the Indian army on its arrival, left in a barge on July 26th, and reached Rosetta on the 29th.

During all this time nothing of importance had occurred at Alexandria, where General Coote's blockading force had been at times reduced by sickness as low as 3,200 men fit for duty. An attempt made by General Menou to cover the east front of his position with an inundation by means of a cut in the canal of Alexandria was skilfully frustrated by the British Engineers, who constructed a dam, 150 yards long and 6 yards broad, across the deepest hollow of the plain, the flanks resting on the high ground. This completely checked the inundation.

Siege of Alexandria.

When the whole of Belliard's army had been embarked, the British troops joined the army in front of Alexandria. Hutchinson arrived and took the chief command on August 15th, and the siege at once commenced.

On the 26th an armistice of three days, to draw up articles of capitulation, was requested by General Menou.

Capitulation of Alexandria, September 2nd, 1801.

On the evening of the 30th the articles were agreed on, and on the following day a representative of the allied forces entered Alexandria to sign the capitulation, which was finally ratified on September 2nd. The French army numbered 11,213 men of all ranks and classes. The embarkation commenced on September 14th. General Baird left Cairo with his Indian army on August 28th, and reached Rosetta in boats on the 31st.

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VI.—CLIMATE.*

Rainfall.

Meteorological observations taken at the time of the French occupation of Egypt and those taken more recently, show that there has been no sensible increase in the rainfall, the great number of trees planted by Mahamad Ali and the constantly increasing area of the canals not having caused any notable change. The average number of days on which rain falls in the Delta is about 12; and the amount varies from 0·12 to 0·83 inches. At Alexandria the rainfall varies from 2·86 to 13·18 inches, the average being about 7·5.

The Suez Canal has certainly somewhat modified the climate of that portion of the isthmus through which it passes, rendering it cooler in summer, and warmer in winter.

Remarks on climate.

The Egyptian climate is more uniform than that of any other place on the globe. Still it varies considerably through the different parts of the country. The whole of Middle and Upper Egypt is characterised by great dryness and clearness of the atmosphere, while the Delta enjoys a much cooler and damper climate. Fogs prevail during the first two months of the receding of the waters. Evening fogs descend very quickly as the sun goes down, and are as quickly deposited after the sun has set, leaving the sky clear, and the air as fresh as after a good shower. Morning fogs are soon dispelled by the heat of the sun, and then follows the clear, beautiful day. On the desert the air is always dry and bracing, and much cooler than that over cultivated land. Dews at night are common in the early and later parts of the year, but exposure to them is not attended with any risk. During winter the nights are piercingly cold on the desert. The moonlight nights are singularly brilliant, but when there is no moon, the darkness that envelopes the earth seems so thick that you can almost feel it, while the sky above is quite clear.

Seasons.

There are about two seasons in the year, summer and winter. The summer extends from April to the end of September. It is ushered in by strong, equinoctial winds, after which a north wind prevails during the remainder of the time, which considerably modifies the heat. At the fall of the Nile, the land being left wet and exposed to the action of the sun, exhalations arise, which render the Delta somewhat unhealthy, the prevailing diseases then being ophthalmia, dysentery, diarrhœa, and ague.

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* From *Consular Reports*, No. 15, 1874, and *Murray's Guide.*

The winter begins in October and ends in March, north winds prevailing in December, January and February, and they are often piercingly cold.

As you ascend the Nile, the weather becomes warmer, and the atmosphere drier, so that Upper and Middle Egypt are more healthy than the Delta; indeed rain but seldom falls in Upper Egypt.

Clothing.

In Egypt flannel should always be worn next to the skin, and a broad belt round the waist is thought to be a useful precaution. The head should be well protected by either a turban or pith helmet. Dr. Mackie, Surgeon to Her Majesty's Consulate at Alexandria, in his report recommends mechanics going to Egypt to wear clothing the same as in England, but of lighter texture; in the winter, however, warm clothing is necessary.

Food, &c.

It is unnecessary to make any change in the mode of living from that usually adopted in Europe; and most persons may eat whatever they are accustomed to in other countries. It is, however, better to avoid much wine and spirits, as they tend to heat the blood, and cause the hot weather to be more sensibly felt; and some will find that fish (chiefly those without scales), eggs, and unboiled milk, do not always agree with them. Bathing in the Nile is by no means prejudicial in the morning and evening; and except in the neighbourhood of sandbanks, there is no fear of crocodiles. Fruit and vegetables, when the former are not eaten to excess, and the latter are properly cooked, are wholesome and cooling, and mutton is better than beef. "The Nile water, when well filtered, is soft and pure, and may be safely used. With some it may at first disagree, and have a tendency to induce diarrhœa, and until this is overcome it should be tempered with a little good brandy."

Meteorological Observations.

The following table gives the average monthly temperature at Alexandria and Cairo :—

Alexandria.	1873.
January	59° Fahr.
February	59° ,,
March	63° ,,

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Alexandria—continued.

	1873.
April	66° Fahr.
May	72° „
June	75° „
July	77° „
August	78° „
September	76° „
October	74° „
November	69° „
December	61° „
Average throughout the year	$69\frac{1}{12}$° „

Cairo.

	Mean of 1870 to 1872.
January	54
February	54
March	63
April	68
May	80
June	84
July	85
August	86
September	82
October	73
November	66
December	59
Average throughout the year	$71\frac{1}{12}$

The Alexandria readings were taken at 9 A.M.; the temperature at 3 P.M. in summer being about 4° above that recorded; the night temperature is 3° lower, except in July and August, when there is but 2° between day and night temperature. At Cairo it is different: there, with the exception of July and August, when the night temperature is about 4° lower than the day, the nights are much cooler than the days, there being sometimes a difference of 40° in the 24 hours. March and April are more particularly alluded to when the reading 63° and 68° would give a completely wrong idea as to the climate to be expected.

At Cairo there is sometimes a little ice. Invalids are therefore often grievously disappointed in Lower Egypt as a winter residence, and suffer much from cold. The climate of Suez, although decidedly hot in summer, is not what would be called cold in Paris or London in winter; nevertheless, fires are sometimes acceptable in the evening in winter. In summer the air of Suez is too dry and parching to be agreeable. The most oppressive wind is from the east, which fortunately does not blow for more than a few days in the year. Little rain and few storms visit Suez.

Mean maximum temperature of thermometer at Suez for each month of the year 1869 :—

January	62·05 Fahr.
February	63·01 „
March	72·25 „
April	75·53 „
May	86·66 „
June	93·80 „
July	92·32 „
August	92·94 „
September	87·47 „
October	81·10 „
November	74·86 „
December	67·56 „

The minimum temperatures occur a little before sunrise, and are generally from 15° to 25° below the maximum. The extreme degree of heat applies only to from 1 to 6 P.M. The forenoon is sensibly cooler, and the morning and evening markedly so, than the maximum. There is no greater blessing at Suez than the cool nights which induce to agreeable rest throughout the hot season, but it is necessary to be careful not to sleep in a draught. Though soft, the air is not overcharged at night, as at Alexandria, with moisture.

VII.—MONEY, WEIGHTS, AND MEASURES.*

Money.

The piastre of 40 paras = (average rate of exchange) 2½*d.* The kees or purse, of 500 piastres = (average rate of exchange) £5 2*s.* 6*d.* The piastres have two values—tariff and current; the tariff value is the standard one, and is used in all the Government offices, by bankers in their accounts, and in the lists of fares for the railways and telegraphs; the current value is continually changing, precisely as the value of paper-money fluctuates as compared with gold, but with this difference, that there is no paper money nor anything else to represent the current piastre. It may be taken, as a general rule, that the current piastre is half the value of the tariff piastre, therefore the two silver Egyptian pieces most commonly met with represent respectively half a piastre and one piastre tariff, or one piastre and two piastres current: there is but one coin to represent the two values.

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* From *Murray's Guide* and *Statesman's Year Book.*

The currency of Egypt being insufficient for its vast commerce, coins of nearly all the nations of Europe, as well as of the United States, have become legal tender. Those most in use are French 20-franc gold pieces and British sovereigns.

The following is a table of the principal coins found in circulation in Egypt with their approximate value in Egyptian, English, and French currency. The Egyptian currency is given in current piastres. It will be easy to recollect that, as a rule, half the number of current piastres represent the tariff value:—

Name of Coin in Arabic.	Coin.	Egyptian Currency.		English Currency.			French Currency.	
		Piast.	Paras.	£	s.	d.	Frs.	Cents.
Guinée ...	Sovereign ...	195	0	1	0	0	25	0
Noos-guinée ...	Half-sovereign ...	97	20	0	10	0	12	50
Shilling ...	Shilling ...	9	30	0	1	0	1	25
Binto ...	Napolean ...	155	0	0	16	0	20	0
Noos-binto ...	Half-Napoleon ...	77	0	0	8	0	10	0
Tarali or Reyal ...	Five-franc piece ...	38	20	0	4	0	5	0
Franc ...	Franc ...	7	20	0	0	10	1	0
Roobee ...	Rupee ...	18	0	0	2	0	2	50
		...		at hotels and shops. 0 . 1 10 at British Post Office and Telegraph.			except at French Post Office, where subject to same reduction as at British.	
Noos-roobee ...	Half-rupee ...	9	0	Same difference in value in proportion as rupee.				
Rebba-roobee ...	Quarter-rupee ...	4	20					
	Rouble ...	30	0	0	3	0	4	0
	25-kopeek piece ...	7	20	0	0	10	1	0
Sebaéen ...	10-kreuzer piece, called a "sebaéen" from its being worth 70 paras.	1	30	Four generally go to the franc, and five to the shilling, though in reality the franc is worth 20 paras more and the shilling one piastre more.				
Medjidieh ...	Turkish dollar ...	36	0	0	4	0	5	0
Noos-medjidieh ...	Turkish half-dollar ...	18	0	0	2	0	2	50
Shilling ...	Turkish shilling ...	9	0	0	1	0	1	25
Tarali or Reyal ...	Egyptian dollar ...	40	0	0	4	0	5	0
Noos-tarali or Reyal	Egyptian half-dollar ...	20	0	0	2	0	2	50
Shilling ...	Egyptian shilling ...	10	0	0	1	0	2	50
Groosh, geersh-pl ...	Egyptian silver piastre	2	0	0	0	$2\frac{1}{2}$	0	25
	Egyptian silver half-piastre.	1	0	0	0	$1\frac{1}{4}$		
Asharéen fódda ...	Egyptian copper 20-para piece.	0	20					
Asharah fódda ...	Egyptian copper 10-para piece.	0	10					
Khamsah fódda ...	Egyptian copper 5-para piece.	0	5					

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Both Turkish and Egyptian gold coins are sometimes met with, but rarely: the Turkish sovereign is worth about 18 shillings, the Egyptian about 20 shillings and sixpence. There are also half-sovereigns and four and one shilling pieces.

Rate of Exchange.

Rate of exchange in tariff piastres:—

The English sovereign from 97½ par to 94.
French 20-franc gold pieces, 77 par to 74½.

Weights and Measures.

8	Mitkál make	1 okeea (wokeea) or Arab oz.
12	okeea „	1 rotl or pound (about 1 ℔. 2 oz. 8 dwt. Troy).
2¾	rotl „	1 oka or wukka.
100	to 110 rotl make	1 kantár (about 98¾ Avoirdupois).
108	rotl make	1 kantár for coffee.
102	„ „	1 kantár for pepper, &c.
120	„ „	1 kantár for cotton.
150	„ „	1 kantár for gums, &c.

For Gold, Gums, &c.

4	kumh (grains) make	1 keerát (carat) or kharoobeh.
64	grains or 16 keerát make	1 derhm (47⅝ to 49 grains English).
1½	derhm or 24 keerát make	1 mitkál (from about 1 drachm to 72 grs. English).
12	derhm make	1 okeea or oz. (from 571½ to 576 grs. English).
12	okeea make	1 rotl or pound.
150	rotl make	1 kantár.

Measures of Length.

Fitr, or span with forefinger and thumb.
Shébi, longest span with little finger and thumb.
Kubdeh, human fist with the thumb erect.
1 drah beledee or cubit equal to 22 to 22⅔ inches English.
1 drah Stambóolee equal to 26 to 26½ inches English.
1 drah Hindázee (for cloth, &c.) equal to about 25 inches English.
2 bah (braces) equal to 1 kassobeh, or 11½ feet.

Land Measures.

22	(formerly 24) kharóobeh or kúbdeh make	1 kassobeh, equal to from 11 ft. 4½ in. to 11 ft. 7¼ in. English.
13⅞	kassobeh or rods make	1 keerát.
24	keerát or 333 kassobeh make	1 feddan or acre.

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Corn Measure.

In Lower Egypt.

9 kuddah make	... ...	1 melweh.
4 kuddah „	... ...	1 roob.
2 roob „	... ...	1 kayleh.
4 „ „	... ...	1 waybeh.
24 „ „	... ...	1 ardeb.

In Upper Egypt.

4 roftow make	... ...	1 mid.
3 roob „	... ...	1 „
8 mid or 6 waybeh make	...	1 ardib, or nearly 5 English bushels.

Price of Provisions, &c.

Price of Provisions at Alexandria in 1870.

		s.	*d.*
Beef	per lb.	0	9½
Mutton	„	0	8½
Turkeys	each	10	0
Chickens	„	0	11
Fish	„	1	0
Eggs	per doz.	0	7
Bread	per quartern loaf	1	0
Butter (Cork)	per lb.	1	6
Egyptian butter (good for cooking) ...	„	1	3
Milk	per pint	0	6
Tea	per lb.	4	0
Coffee	„	0	11
Cheese	„	1	3
Potatoes	„	0	1½
Cabbage	each	0	2
Cauliflowers	„	0	3
Peas	per lb.	0	3½
Beans	„	0	2
French beans	„	0	2½
Turnips	„	0	1½
Rice	„	0	3
Lettuce	„	0	0¾
Tomatoes	„	0	1½
Bamias	„	0	3
Badangan (egg plant)	„	0	2¾
Vegetable marrow	„	0	3
Yams	„	0	1½
Apples	„	0	3½
Pears	„	0	3¾
Figs	„	0	1
Apricots	„	0	5
Pomegranates	„	0	2
Grapes	„	0	2
Melons (water)	each	0	7
Bananas	per lb.	0	7½

The Suez markets are fairly supplied with corn, meat, poultry, fish, and vegetables, though at prices somewhat higher than those of Cairo. In 1870, wheat of the same Egyptian kind as then quoted at 39*s.* a quarter in London, cost at the rate of 50*s.* a quarter at Suez, against 45*s.* at Cairo. In 1872, the rate at Suez was 44*s.*, and 41*s.* at Cairo. Flour, made from Egyptian wheat, at Suez sells by retail at 3*d.* a pound, but it will not serve for fine bread.

		Suez.	Cairo.
Legs and shoulders of mutton grazed on the desert, large boned and lank, but of fair flavour	per lb.	1*s.*	7½*d.*
For fowls, very small	each	1*s.*	
Turkeys	a-piece	10*s.* to 15*s.*	
Geese	„	3*s.*	
Vegetables, French beans	per lb.	10*d.*	6*d.*
Potatoes imported from Marseilles and Malta	„	4*d.*	4*d.*
Fish, best sorts	„	1*s.*	

The Red Sea abounds in fish, some of which are good to eat; among the best is the rock-cod (Arabic kousher), a flat fish called the moorgan, grey mullet, prawns, crabs, and a sort of bream, brought by rail from Lake Tinsah. Turtle is also occasionally seen. At Suez may also be now and then obtained gazelle, hare, quail, desert grouse, and occasionally ibex.

At least $\frac{1}{16}$ of the produce above Girgeh (the former capital of Upper Egypt) finds its way to the Hedjas, principally through the port of Cosseir. The amount sent down to Cairo is very trifling, unless in extraordinary seasons. The shipping season for Cairo from the Upper Nile commences about June, that from the Bahr Jousef to the same destination about the end of August.

The average amount of grain sent down from each district cannot be given in detail. From inquiries made by Mr. Badger among the European and native merchants, it appears that the amount of grain and pulse, the property of private individuals, received at Boulak during the last year was from 750,000 to 800,000 ardebs; much, however, was shipped direct to Alexandria. The above remarks apply more particularly to the operations of private individuals. The Government boats generally take cargo only on Government account; those belonging to the Cairo arsenal are sent up in June and July. Much corn is now grown in the rich country of Londau. No estimate can be obtained of the quantity of grain received on Government account. This last remark applies to Egypt generally. Troops stationed at Damietta, or advanced to Salahieh,

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Katieh, or elsewhere, on the borders of the desert, could obtain goats and sheep in any number from the neighbouring tribes of Arabs at 4, 6½, to 7 rupees each, also skins for carrying water, corn, &c. At Suez also, sheep, &c., in any numbers could be obtained from the Arabs.

VIII.—THE NILE.

Annual Rise and Fall.

Captain Collinson, Royal Engineers, who was sent to Egypt in 1858 to report on the military arrangements of that country, gives the following data connected with the annual rise and fall of the River Nile, and its average height at the period of inundation, in memoranda on Egypt, 1858, marked as follows :—

Abstract of the Register of the rise of the Nile kept at the Barrage by the Egyptian Water Transit Administration, from 1846 to 1855.

May	30	... ... 2·47	feet above the zero.
June	5	... ... 1·81	„ „
„	20	... ... 1·8	„ „
July	5	... ... 3·1	„ „
„	20	... ... 5·3	„ „
August	5	... ... 14·4	„ „
„	20	... ... 19·1	„ „
September	10	... ... 20·19	„ „
„	20	... ... 20·39	„ „
October	5	... ... 22·27	„ „
„	10	... ... 22·14	„ „
„	15	... ... 22·11	„ „
„	20	... ... 21·35	„ „
„	25	... ... 20·65	„ „
November	30	... ... 12·30	„ „
December	20	... ... 10·65	„ „
January	5	... ... 9·37	„ „

N. B.—The record is kept in French metres which have been reduced to feet at 3·3 feet = 1 metre.

From January 5th to May 30th the fall in the water is regular, and between the times given in the abstract the rise or fall is regular. Captain Collinson selected from the diagrams those periods at which there appeared to be a decided change in the flow, and took out the observations for those periods for the 10 years. The number of feet opposite each day is the abstract of the 10 years' observations, and between the periods given the rise or fall may be taken to be regular.

This abstract, therefore, gives a very fair idea of the average rate

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of rise and fall of the Nile in the Delta. It appears from it that for the first fortnight in June the river is stationary at its lowest, and that during the whole of the rest of the year it is either rising or falling; that there is a slight rise early in July, but the grand rise does not begin till towards the end of that month, and then it rises steadily to the middle of August, when there is a lull (and sometimes even a fall again), till towards the end of September, when it rises quickly to its full height, at which it remains for about the first fortnight in October, and then begins to fall slowly to the end of that month, when the rate of fall increases, to the end of November, at which time probably the flood waters are exhausted, for there is a considerable decrease in the rate, and from the beginning of January to the end of May the decrease is gentle and regular, the mere drain of the saturated ground most likely.

The following table, extracted from the *Statistique de l'Egypte,** confirms many of the remarks of Captain Collinson. The observations here given were taken at the Nilometer at Rhoda Island, opposite old Cairo. It shows the various dates at which the Nile was highest, and different heights to which it rose from 1856 (commencing where Captain Collinson left off) to the present time.

1856	2nd October	25 feet 5 inches.
1857	13th September	21 „ 3 „
1858	6th September	21 „ 0 „
1859	27th October	20 „ 9 „
1860	17th October	25 „ 2 „
1861	27th September	26 „ 0 „
1862	22nd October	23 „ 1 „
1863	20th September	26 „ 7 „
1864	20th September	19 „ 6 „
1865	18th October	23 „ 0 „
1866	27th September	27 „ 3 „
1867	11th September	21 „ 2 „
1868	27th August	19 „ 3 „
1869	11th October	27 „ 7 „
1870	14th October	26 „ 0 „
1871	27th September	24 „ 3 „
1872	20th October	25 „ 1 „
1873	11th September	19 „ 9 „
† 1874	7th October	29 „ 0 „

The *Pall Mall Budget,* November 1874, describes an extraordinary rise of the Nile in that year, and the precautions that had to be taken to

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* "Statistique de l'Egypt Année 1873," page 16.

† These last two years are taken from the *Pall Mall Budget,* November 1874.

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prevent it breaking through its banks. The river, says the *Pall Mall*, sometimes makes false starts; in 1869 it made five, and in 1872 three, on both occasions commencing its serious rise on the 1st July. The rise commences at various dates, from the second week in June to the earlier days of July.

Prospect of "a good Nile."

The time when a guess may be made as to the prospect of "a good Nile" is about the 24th July, a guess which telegraphic news from Khartoum converts into a certainty.

On the 27th of July this year (1874), it became obvious that the Nile flow would probably be an extraordinary one. On that date it was double that of 1868, one-third more than that of 1873, and in excess of 1869, when the Nile rose 29 feet 2½ inches in the Rosetta branch, in about the middle of the Delta. Extraordinary exertions were made under the supervision of the Viceroy; immense masses of stone were quarried, and wood was brought from Alexandria. Officers of the army kept watch mounted, besides the ordinary watchmen at every 100 yards. About eight-tenths of the population was employed for three months watching and strengthening the banks of the Nile, which were raised in many places from 6 to 10 feet.

Barrage.

(See plan attached.)

The celebrated barrage across the branches of the Nile, immediately below the bifurcation, is about 12 miles below Cairo.

Project.

The project of the barrage, which has been partly completed, is M. Mongel's, who has lately left the service of the Pasha, having been Chief Engineer for many years. It is to put a stone dam across each branch, sufficient to keep the water always up to the ordinary flood-level if desired. These dams are constructed, that is to say, two bridges have been made, one across the Rosetta branch, 1,525 feet in length between the abutments, including 61 arches, the other across the Damietta, with 71. The piers are about 6 feet 6 inches wide and 50 feet long, and at 22 feet 10 inches central intervals, the arches spanning them being 16 feet 4 inches, but only 30 feet deep, forming a roadway of that breadth, the other 20 feet of the piers projecting (above stream side) as a cutwater, the tops being about 3 feet above ordinary high Nile. When Captain Collinson was there, the water was 2½ feet below its highest for that

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year (1858), which was considered in Egypt a good flood, and was 5 or 6 feet below the top of piers.

The openings of the bridge were originally intended to be closed with wrought-iron sluices worked by rack and pinion from the cutwater of the piers. Subsequently a very special sort of sluice, designed to be operated upon by compressed air, was adopted for the Rosetta barrage, whilst up to the present time the arches of the Damietta barrage are closed each year by temporary sheet piling. At each end of both bridges the piers are larger and prolonged to form locks.

The whole river traffic of the Nile passes through these bridges by one or other of the locks according to the season. Boats going from any parts of the Damietta branch to Alexandria must come up the junction and go down the Rosetta branch, there being no water communication across the Delta.

There are wing walls on the main land sides of each bridge, extending 100 yards up and down stream.

There is about 10 feet of water in the river at low Nile here, the rise being from 25 to 35 feet.*

The masonry is principally brickwork, of a hard red brick made on the spot, with limestone quoins, &c. All the brickwork seen by Captain Collinson was very bad, and he was told there was a failure in some of the arches, but he did not examine them closely.

To obviate the water forcing its way round the ends of the bridges by percolating through the alluvial soil, and either oozing out below or forming a new channel, the banks to a considerable distance above the bridges have been faced with masonry, while the side canals will be sufficiently deep and wide to receive a large portion of the accumulated waters.†

A canal is completed, uniting the two branches of the river some 100 yards above the barrage. From this canal, at right angles to it, running in a northerly direction through the Delta, another canal is cut, for its more extensive irrigation, called the Menonfieh. This may be considered the

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* Captain Collinson's Report, $\frac{416}{1}$.

† There are 3,500,000 feddans (1 feddan = 1·04 acres) of cultivated land in Lower Egypt. Sections of the canals are determined by the condition of irrigating 1,000,000 feddans of land, or, in other words, supplying over 8,000 cubic feet of water per second, with the flattest inclination reasonably practicable. M. Mongel estimated the minimum discharge of the Nile at 65,000,000 cubic yards per day, but recent measurements by Mr. E. C. Fowler, the present Consulting Engineer of the Khedive, have shown that the discharge at times is as low as 40,228,000 cubic yards per day, 12,570 cubic feet per second.

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principal artery for the Delta supply. It is proposed to carry it down to the sea, while from it a network of canals will be made to cover the whole surface of the Delta. When the sluice-gates are shut, the water will rise into these canals and be applied for irrigation purposes as required.

The canal, which is cut between the two branches of the Nile, has its northern bank lined with a masonry quay wall to fix the head of the Delta, constructed on a curve following approximately the form of the land.

The quay wall, about a mile in length, is founded on a mass of beton, 8 feet deep below low water, and the foundation is protected by piling and rubble work. The construction differs from ordinary quays inasmuch as the total height of 26 feet is divided into four steps, separated from each other by a bench or berm, 4 feet 6 inches wide.

The Behera Canal, destined to irrigate the tract of land westward of the Rosetta, and the Charkieh, that eastward of the Damietta branch, have been commenced.* The portions completed of the Menonfieh, Behera, and Charkieh canals are excavated to a depth of 1 foot below low Nile.† The Behera is 66 feet wide, and the other two are 197. It is needless to observe that opinions vary considerably as to the practical result of this grand project, whereby it is proposed to control and command the vast body of water which composes the Nile, to dam up these waters to a higher level, and bring into culture vast districts now desert. The first matter for consideration is, are the bridges of sufficient strength to bear the enormous pressure of the waters? The tops of the flood-gates, when lowered down, are calculated to be 4 feet above the high Nile level; the rise and fall of the river is about 22 feet. Strong must be an artificial embankment to withstand such pressure.

The following comments are made by Captain Collinson in his report $\frac{418}{11}$, 1858 :—

"Even supposing that the work was good and kept in good order,—two incredible suppositions for a work of that magnitude in Egypt,—the operation of them (the barrages) would tend to turn the course of the

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* From "Engineering," 21st January 1876.

† The original intention was to have made the bottoms of the canals 6 feet 7 inches above low Nile, but as they cannot venture to get at the proper head of 15 feet of water the present depth was found necessary. Even with this increase of depth the supply of water during the summer months falls far short of the desired amount. The effect of the barrage at present is estimated as throwing a supply of 1,200 cubic feet of water per second into the canals of Lower Egypt during a period of eighty days, at a level of 5 feet 3 inches higher than it would have been if the barrage had not been constructed. The total quantity of water thus delivered is about 300 millions of cubic yards.

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river to the east and west of the present channels. The land on each side, like the whole of the Delta, being 20 to 25 feet above the Nile, at high Nile it is all covered with only a narrow dyke along the bank of the river, which is all the river has to break through to find a new channel across the country. The bridges themselves have caused an island to be formed in front of the 'Cow's Belly,' which did not exist in the old French map, and which is increasing. To benefit the country, the waters ought to be raised 20 feet above low Nile, less than that not entering the small canals. With this head of water, how is the body of water flowing down the river to get through the bridges without causing such a torrent as will carry away the foundation of the piers? It will be a new cataract of the Nile. There is only one small escape for it, a canal 50* feet wide through the centre of the Cow's Belly, which, in the project, was intended to carry the water at the higher level to irrigate the land below.

"The impracticability of making use of these dams for irrigating purposes makes me think there is a foundation for the report that the two bridges were completed chiefly on military considerations; the more so, because the original barrage project of M. Linant, which was 10 miles further down the river, was abandoned when partially completed in 1846, and Mongel's then commenced, Linant's bridges being 5 miles apart, and therefore not constituting the good military position of Mongel's. It is generally believed amongst foreigners in Egypt, who know the whole circumstances, that it is now considered a military project, and that a complete system for the defence of Egypt against invasion from any quarter had been laid down in the office of the Etat-Major-Général at Paris during the time of Marshal Soult. M. Mongel, having finally quitted Egypt, there is no person responsible for the success of the barrage for irrigating purposes, the whole of the works there being now under the superintendence of M. Motte, Chief Military Engineer in Egypt. One of the foremen on the spot said to me that the gates of the bridges were to be kept ready to fix, so as to flood the country on the approach of an enemy—an idea that would not have originated itself in his own mind."

Soon after the commencement of the superstructure, there were indications of cracks in the left hand arches of the Rosetta barrage, but these first gave cause for anxiety during the high Nile of 1867, when there was an evident tendency exhibited on the part of this portion of the work to slip down stream. At low Nile, also, when the sluices of the Rosetta barrage have been lowered, and the openings in the Damietta barrage closed with sheet piling, the springs in the bed of the river have increased and the sand has been a good deal carried away, although the originally intended head of 15 feet has never so much as been approached. As an illustration of the care which is taken to obviate all risk of undue pressure, the following may be mentioned :—

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* In "Engineering," January 21st, 1876, p. 42, this figure is given as 197.

On the 16th of July 1875, at 7 A.M., the level of the Nile was 8 feet above zero, or theoretic low Nile, on the upper side, and 2 feet 1 inch on the lower side of the barrage, a difference of level of 5 feet 11 inches. During the succeeding 36 hours 12 sluices, or one-fifth of the whole, were raised, with a consequent lowering of the level above barrage to the extent of 1 foot 6 inches, and a raising of the level below barrage as much as 2 feet 6 inches, thus reducing the difference of level, or effective head on the works, from 5 feet 11 inches to 1 foot 11 inches in the short space of a day and a half and with a rising Nile.

Navigation.

Captain Collinson makes the following remarks on "The Navigation of the River" in his Report $\frac{418}{32}$, 1861 :—

"There are boats of 150 tons that navigate the river in flood-water time, but not many of them ; the majority of the boats on the river are between 30 and 60 tons; these navigate the Upper Nile and the two main branches to Rosetta and Damietta, and by the former and the Mahmoudieh Canal to Alexandria, and also the Moez branch as far as Zagazig. None of the other branches, natural or artificial, are navigated except for short distances and local traffic, partly on account of their being choked, and partly because of the bridges. I believe boats can go from Mansourah to Menzaleh by canal in high Nile.

"The navigation is very difficult in low Nile time, owing to the shoals and bars, in several places there being less than three feet of water. I heard of six fords at low Nile between Cairo and Damietta, two between Benha and Mit Camar, one 6 miles above Mansourah, and two below Mansourah, all used by the natives; and doubtless there are as many on the Rosetta branch. . . . . . . M. Linant says the breadth of the Rosetta branch at the head of the Delta (at mean Nile probably) is 435 metres (475 yards), that of the Damietta branch 203 metres (221½ yards), and the mean depths 2·66 metres (8 feet 8 inches) and

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4·96 metres (16 feet 3 inches) respectively; and M. Clot (late Director of the Egyptian Military Medical Department) says the average fall between Cairo and the sea is $\frac{1}{25000}$, and the ordinary velocity is 2 miles per hour and the flood velocity 3 miles per hour."

The length of the River Nile from Assouan (at the first cataract) to the barrage is 592½ miles. The following table gives its average breadth in the provinces through which it flows :—

Esné	770 to 960 yards.
Keneh	770 „
Girgeh	1,250 to 1,380 „
Siout	960 to 1,340 „
Minieh	860 „
Benisouef	1,920 to 2,300 „
Giseh	770 to 960 „

With reference to the navigation of the Upper Nile, Bertrand mentions the fact that, after the battle of the Pyramids, which took place on the 21st of July, the French army was obliged to wait two months for the river to become practicable before it could commence operations in Upper Egypt.

The Rosetta branch is 134 miles long and from 460 to 690 yards wide. The Damietta is 135 miles in length, with a width varying from 280 to 270 yards.

River Steam-boats and ordinary Nile boats.

The following extracts from Sir James Outram's Report and supplement give an estimate of the number of boats and steamers on the Nile. At page 55 of the Supplement, 1862, the Rev. Mr. Badger writes: ". . . . . The Viceroy possesses at this moment between 30 and 40 river steamers and steam-tugs with a considerable number of flats, each capable of carrying 400 men or 150 horses or camels. . . . ." At page 36 of his Report, 1862, Sir James Outram says: "All the information I have been able to obtain regarding the number of boats on the Egyptian waters will be found in Appendix No. 11." Writing in 1840, Dr. Bowring thus expresses himself: "There have been of late years a considerable quantity of boats constructed for the navigation of the Nile. During the occupation of the French, the number of boats engaged from Assouan to Cairo was only 700, and the number employed below Cairo, on the Damietta and Rosetta branches, was 900, total 1,600. In 1833, the Government alone had 800 boats, and private owners 2,500, total 3,300. But since then the number is greatly augmented."

"I (Sir James Outram) believe that 5,000 affords a fair estimate of

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the number of boats now in existence on the Nile canals and lakes. Besides these there are some 30 steamers which ply between Alexandria I have elsewhere shown that though in the first case an invading army from the Mediterranean might, and probably would be, through the influence of the local Government, unable to obtain boats, an army operating from Upper Egypt could not so easily be deprived of the means of river transport." The following is extracted from Appendix 11 above referred to: "The amount (of produce) sent down (from Upper Egypt) to Cairo is very trifling, unless in extraordinary seasons. The shipping season for Cairo commences about the end of June, for boats of sizes running up to 300 or 400 ardebs* (an ardeb is 5 bushels), and the larger boats of sizes running up even to 3,000 ardebs,† commence getting their cargo on board, to be ready for the first opportunity, but few of these reach Cairo before the end of August. The shipment from the Bahr Yousif commences about the end of August. . . . . Few boats are sent up from Cairo, except occasionally as a speculation, which last year (1861) was ruinous. The boats in general are the property of the natives of Upper Egypt, and when in want of repairs they get them done up there; as also, when the river is too low to work, the boats are laid up under the care of their owners. With regard to the number of boats employed in Upper Egypt, it is not known even at the arsenal (where, if there be any information to be relied on, it ought to be found)."

Captain Collinson gives the following table in his Report, which, although perhaps of little value at the present date as regards numbers, is of importance as showing the sizes of the various boats :—

"*Table of the vessels that can navigate the Nile, taken from the Report of the French Commission, 1798–1800.*

Name.	No.	Draught.		Tons.	Months during which they can navigate.
		ft.	ins.		
Lower Egypt—					
Gt. Mâch	50	4	6	60	7
Sm. Mâch	50	3	10	30	10
Cange	60	1	6	8	12
Gt. Cayass	600	4	0	60	8
Cayass	800	3	0	30	10
Sm. Cayass	1,000	1	6	6	12
Upper Egypt—					
Cayass	10	7	0	200	5
Sm. Cayass	600	4	6	40	9

"*N. B.*—The number of boats has probably much increased since that time, and the river has probably shoaled."

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* 40 to 50 tons (about).

† 400 tons (about).

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Effect of Inundation on Country.

A.—Lower Egypt.

The effect of the inundation is to cover in Lower Egypt the sand of the desert, with soil about 40 feet thick, carried down by the waters of the Nile. As the waters subside, this soil is cultivated, and produces the most luxuriant crops, capable of affording means of support to a denser population than that of Belgium. The principal articles grown in the Delta in the summer or water months are Indian-corn, rice, dourra, semsin, sugarcane, and cotton. In the winter or dry months wheat is grown, the Indian-corn being cut in December, the wheat in April or May.

The Delta is a perfectly flat table-land, being a bed of the soil brought down by the Nile, and deposited in a basin of the desert. The only elevations on it are the villages, banks of the canals, and railways. The desert rises from it with a gentle inclination, so that directly you ascend from the cultivated ground you begin to have a view over the Delta. It is cultivated everywhere, wherever the water of the Nile can be conveyed, except near the sea. There are no hedges, yet the land is minutely marked off by boundary stones. The only ditches are those required for irrigation. The trees are generally in clumps, and are chiefly date palms, sycamore, or wild fig, and the shumac acacia; these are all of great value to the natives, and should not be injured. Thus the Delta presents the appearance of one large field of corn or vegetables, according to the cultivation, or of a sheet of water when the flood is on. The average height of it above low Nile is probably 15 feet (the height of 20 feet given in Captain Collinson's Report on the barrage is that of the valley of Upper Egypt above low Nile); thus there is 5 feet of water over it at high Nile.

The inundation is controlled with great care. When the river has risen to a certain height, particular bridges over particular canals are dammed, and the people of the district are allowed to let the water run on to their lands, and after a certain time the people of the district below them are allowed to draw it off from the lands already flooded on to their own; thus the water may be said in a general way to pass from the upper lands to the lower over the whole country. The feeders or canals that run in the natural direction of the river give an additional and quicker supply to the lands lower down stream, and the cross canals serve both as reservoirs for the supply of the lands below them and

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drains for the lands above them. Very few of the canals have water in them all the year round; the main canals—the Moez, the Balbeis, and the Birket-es-Saba—are perhaps all. The management of the canals, feeders, and dams is all under the control of governors of provinces, who regulate the times for letting on and off the water to districts and keep the canals and dykes in good order by the forced labour of the inhabitants. The principal dykes are those running across the line of direction of the river, as is evident from the mode of irrigation. A pathway, passable for animals, will be always found along these at all times of flood; the other pathways used in time of high Nile are along the banks of the canals and river, crossing at the bridges. They are all about 10 to 15 feet wide at top, made simply of the natural soil which, when dry, becomes firm enough for horse traffic.

There are no wheeled carriages out of the great towns, and although the pathways are wide enough, it would be a very tedious operation to get carriages along them, owing to the innumerable cuts for drawing water from the canals on to the lands. When the water has been finally drawn off the land for the year, there are pathways more direct from village to village, raised a little above the surface; otherwise they are the same as all other pathways, without any obstructions, but the same innumerable cuts for water.

The infantry and cavalry could cross the country in any direction; it would be difficult, though not impossible, for field artillery, from the soft soil and the numerous ditches; they would have to be provided with planks to get the wheels over such obstacles. A small pontoon bridge would be very useful to cross the canals (whether wet or dry) without going round by the bridges.

The inhabitants have been reduced to live in small villages, their houses crowded together and raised as much as possible above the level of the Delta, to allow their lands to be inundated. During this period ferry boats ply between the villages, some of the larger of which on the sites of ancient towns are 50 or 100 feet above the Delta.

B.—Upper Egypt.

In Upper Egypt the water of the inundations extends in some places on the right bank as far as the foot of the mountains. The canals here only serve for irrigation during the inundation, and not during the time of low Nile, as in the northern provinces. The ground near the banks of the river being considerably higher than that towards the desert,

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canals are necessary, or the river might rise without inundating the country. These canals receive their water from the Nile and are cut through the elevated ground on its banks and then turned so as to pursue a direction as much as possible parallel to that of the river. To prevent the water flowing freely through these canals and tearing up the ground without properly inundating it, basins have been formed by means of dykes going from the banks of the river to the desert, and also along the river and canals where necessary. By means of masonry barrages and weirs the amount of water allowed to flow through is regulated according to the rise of the river.

Topography of Banks.

The Nile, which flows northwards through Abyssinia, Nubia, and Egypt to the Mediterranean Sea, is formed by the junction at Khartoum, about 15° 34′ north latitude and 32° 30′ 58″ east longitude, of two great arms, the Blue River from the south-east, and the White River from the south-west. From 17° 45′ north to its embouchure, a distance of about 1,350 miles, it receives no affluent whatever, either on its right or left bank,—a solitary instance, as Humboldt has remarked, in the Hydrographic History of the Globe. From the point of junction to Assouan, 6 miles below the point where the river enters Egypt Proper, there are six cataracts, the first or most northerly being at Assouan. From the first cataract the Nile runs in a quiet and very tortuous stream through Upper Egypt, enriching a valley which, except at Fayaum, is of very contracted dimensions, the mountains and burning sands of the desert encroaching so closely upon it that it seldom exceeds 10 miles width, and is frequently not half so much. The border of the desert and Upper Egypt is formed on the east side by calcareous mountains and rocks, and not by sand-hills, as in the western part of Middle Egypt. In Upper Egypt the mountains on the western bank bound the cultivation, or they are separated from it by plains of slight extent of solid ground, stony, with very little sand.

On the eastern bank the mountains fall abruptly to the cultivated land; during the inundation their feet are washed by the water, and in many places they border on the river in the form of cliffs. There are no fortifications in any part of the country between Keneh and the vicinity of Cairo. The following remarks of Bertrand, p. 309, are of importance, as showing the actual strategical use made of the hills on the right bank, at a short distance below the first cataract, by the French in 1799.

Hassan Bey was in the desert between the Nile and the Red Sea. "Desaix blockaded him in the desert. The deserts of the Isthmus of Copts are covered with rough and impracticable hills; you can only pass by the gorges; these are three,—one which debouches on the Nile at the wells of Bir-el-Bar, the other at the village of Hagâzy, and the third opposite Edfou. Desaix encamped at Bir-el-Bar with half his force. He sent General Belliard to occupy Hagazy with the other half. He considered the pass of Redecieh opposite Edfou, which is a detour of 45 leagues of desert without water, as impracticable." Accordingly, Hassan, with his army in a state of starvation, was obliged to leave his camp at Quitta (El Egaytah) and endeavour to force his way through the valley of Bir-el-Bar.

Descending the Nile we come to Keneh, a large and important town situated on a canal about 2½ miles from the right bank of the river. It is 405½ miles above Cairo. From Keneh the direct road to Cosseir on the Red Sea branches off to the east.

Commanding Point, No. 9.*

(340 miles above Cairo, according to Outram.)

On the right bank, 368 miles above Cairo, opposite Farshoot, the mountain of Negh Aboo Fideh, 400 feet high, forms a commanding point. Farshoot, a good-sized village, is on the opposite bank and 1½ miles from the river. About 3 miles higher up, the Nile, which here makes a bend, is again commanded from about the same height.

Commanding Point, No. 8.

(319 miles above Cairo, according to Outram.)

On the right bank, 340½ miles above Cairo and 2 miles below Girgeh (on the opposite bank), Gebel Girgeh abuts on the river at the tomb of Sheik Salim, and immediately commands it for a few hundred yards; it is 300 feet high. Girgeh is situated close to the left bank of the river, but is not now a place of much importance.

Commanding Point, No. 7.

(305 miles above Cairo, according to Outram.)

At Ekmeem, 320 miles above Cairo, a road goes off eastwards to old Cosseir, and at this point Gebel Asserut, 250 feet high, runs parallel to the river for about a mile, forming a commanding point on the right

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* The numbering of these points is taken from Sir James Outram's Report, Appendix 25. Concerning them, Sir James makes the following remarks:—"At all the above points, the rocky mountains are precipitous bluffs, rising immediately above the river, and being spurs from the main range of mountains which run parallel to the river, they could not be turned to the eastward.

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bank. Three miles further down on the left bank is Sohag, the capital of the province of Girgeh, a well-built and important town. Here is the mouth of the Sohagieh Canal.

Commanding Point, No. 6.

(270 miles above Cairo, according to Outram.)

On the right bank, 290 miles above Cairo, the mountain Gebel Sheik Haradin immediately commands the river. It is 400 feet high and very precipitous.

Siout, the capital of the province of the same name and residence of the Governor of Upper Egypt, is 247½ miles from Cairo by water. It stands at some distance from the river on the left bank, and a village called El Hamra is its port. The Libyan chain advances considerably towards the east in this part, the mountains being of limestone rock. A road from Siout leads to Ghareb on the Red Sea.

Commanding Point, No. 5.

(210 miles above Cairo, according to Outram.)

Passing Manfalout on the left, we come to the Abool Fida range on the right bank, whose most northerly point is 228 miles above Cairo. It rises perpendicularly from the water 350 feet high, and runs parallel to the river for several miles, frequently within gunshot. Some 10 miles lower down the river, on the left bank, is the commencement of the Bahr Jousef Canal. Minieh (railway station), a large and important town, is prettily situated on the left bank of the river. It is 160 miles from Cairo by water and 151 by rail.

Commanding Point, No. 4.

(130 miles above Cairo, according to Outram.)

Ten miles below Minieh, on the right bank, the mountains of Gebel Etair, 300 feet high and very precipitous, immediately command the river for about a mile; in a direction up stream they slightly recede, and run parallel for some miles, frequently within gunshot.

Commanding Point, No. 3.

Passing Aboo Girgeh on the left, we come to a rocky ridge on the right bank opposite Mirara (Mirana), 100 miles from Cairo. It is 100 feet high, and flanks the river for upwards of a mile. The tomb of Emharuk is on the summit.

Commanding Point, No. 2.

On the right bank, 90 miles above Cairo opposite to the village of Arab Shaut, near Feshn (railway station), a rocky ridge, about 100 feet high, closely commands the river.

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Commanding Point, No. 1.

A rocky ridge, 80 feet high, at Sheik Abon Nour, about 80 miles above Cairo, on the right bank, commands the river. Sheik's tomb is on the summit of the ridge. This position is nearly opposite Bibbeh (railway station).

The next town of importance we come to is Benisouef (railway station), on the left bank of the river. It is 73 miles from Cairo. From the right bank a road goes to the east to the monastery of St. Anthony. On the left bank the valley of the Nile expands, forming the large and fertile plain of Fayaum, with the Birquet Kiroum at its western extremity. This plain is watered by the Bahr Jousef. Thirty miles lower down we come to Atfieh, from whence a road leads also to the monastery of St. Anthony.

From Es-Soof, 38 miles south of Cairo, a road goes by the Wadi Ghomeyyer to Suez.

Proceeding onwards we come to Cairo, the capital of Egypt, where the river is crossed by an iron bridge. Twelve miles below Cairo the Nile divides into the two branches by which it now reaches the sea. The western is called the Rosetta and the eastern the Damietta, from the two principal towns at their mouths. At this fort is the important barrage described at the commencement of this section, and its fortifications.

The Rosetta branch waters the provinces of Gizeh, Menonfieh, Beherah, and Garbieh; the Damietta those of Kalioubieh, Menonfieh, Charkieh, Garbieh, and Dakhalieh.

The valley of the Nile opens out on both sides from a short distance above Cairo, forming the large and fertile plain of the Delta (or Lower Egypt), which at the sea is upwards of 150 miles in width. Throughout the Delta there are innumerable canals and water-courses flowing from both branches of the river, and pursuing a somewhat parallel course. Many of them are natural and others have been improved, or made entirely, by the inhabitants. Those that are navigable have been described under Canals. "These are all used for irrigation, and it is by this means" that the extreme fertility of Lower Egypt is secured.

Along the top of the natural bank of the river runs an artificial bank or dyke 10 to 20 feet wide and some feet above highest Nile. At the level of ordinary high Nile the bank is worn away nearly perpendicular, below which it slopes gradually to the centre, and is so firm that people cultivate it as the river falls. Thus the top of the bank,

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on the average. The modern harbour, where the trade of the port is now carried on, is situated at the north-east end of the bay, adjoining the southern and western sides of the city, in a nearly semi-circular form, and extending from the palace of Ras-el-Tin by the arsenal dock to the terminus of the Cairo Railway at Gabari.

The English Admiralty chart accompanying Consul Stanley's Report* shows a long reef of rocks, most of them sunken, which stretches from Cape Eunostos to Marabut Island. Through this reef there are three passages for vessels, the Corvette, the Boghaz, and the Marabut, the Boghaz being the principal entrance to the port. The minimum depths of water in each of these are 5, 4½, and 4 fathoms respectively. The deepest part of the harbour, about due west and due north of the Catacombs, is 10, 10½, and in one place 11 fathoms; close in, to within 200 feet of the shore, it is from 4 to 6; and under the town itself, at little more than 1 cable's length off, 3 and 4 fathoms. The north-east end of this bay, surrounded by land on every side except one, was intended by nature for a harbour. The only winds to which it is open are those from west-south-west to north-west. These, however, are the prevailing winds in this part of the Mediterranean, where they blow during eight or nine months of the year. Ships have hitherto been in the habit of anchoring in the roadstead, and discharging by means of lighters, &c., but the new harbour works will put an end to this slow and antiquated process. When completed, these works will provide Alexandria with a port containing an area of 1,400 English acres of still water, 30 feet deep and upwards, and landing quays nearly 3 miles in length.

The first work undertaken was the construction of an outer breakwater to shelter the harbour from westerly winds. The work commences at a point 800 yards south-west of the light-house on Cape Eunostos, thence stretching 500 yards in a south-westerly direction, and thence by a bend of 2,050 yards further in a south-south-westerly direction, total length 2,550 yards. The character of the breakwater works is peculiar. They consist of large blocks of concrete of 20 tons deposited pell-mell on the sea-side, of small rubble stones in the interior to fill the interstices between the blocks, and of large rubble stones, each weighing from 2 to 10 tons, on the harbour side. The width of the work is 20 feet at the top with natural slopes to the bottom, and it is laid in 20 feet of water. The top of the breakwater is 10 feet above the lowest level, or 7 feet above the highest level of the sea. The maximum daily rise of the tide

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* Reports from Her Majesty's Consuls, &c., No. 2, 1872, p. 381.

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here is 12 inches, but the level of high Mediterranean when the water is forced up into the Levant by westerly gales is 3 feet above the level of low Mediterranean, caused by gales from the eastward. The execution of this work was intrusted to Messrs. Greenfield and Co., of London, who commenced their operations in the summer of 1870. A piece of land on the shore at Meks, 4 miles south-west of Alexandria, was conceded to them, from which they obtain an unlimited supply of stone and sand. In addition to the works of the breakwater, a great harbour mole springs from the shore at the landing place of the Cairo Railway, and extends thence in a northerly direction for a length of 1,100 yards. The mole has a width of about 100 feet on the top. Both the mole and the quays will be traversed by railways. The mole will run out straight to the light-house, the idea of giving it a bend towards the arsenal having been abandoned, as it would have made the harbour too cramped. Vessels are not to come alongside it, but small iron jetties will be run out for them.

A line of quays is proposed from the landing place of the Cairo Railway, along the Marina, to the arsenal dock ; and in connection with the quays, the bottom of the harbour in front of them is to be dredged to a minimum depth of 28 feet. The length of the quays will be 2¾ miles altogether, connected by railways with the city and the interior of the country.

The chart defines, by red colour at E, a shoal of rock known as the outer 17 feet patch of the "Boghaz." The shoal E compels all large vessels entering the bay by the principal passage to change their course in the middle of the entrance from the course F, G, from sea to G, H, to clear El Kot. Therefore vessels cannot enter or leave this port in the night time. It is now proposed to blow up the patch of rock at E. Vessels could then come straight in from sea on the course G, H, marked by two leading lights on the shore, until the breakwater is rounded, and so into the harbour. The area of deep water, 30 feet and upwards, enclosed within the outer breakwater, is 1,400 English acres. The area of 28 feet enclosed by the harbour mole will be 177 English acres.

There are at present three lights in Alexandria harbour, *viz.* :—

(1.) At Ras-el-Tin (N. lat. 31° 12': E. long. 29° 52'), a 20-second revolving light visible at 20 miles.

(2.) A light at the end of the mole.

(3.) A red light, 25 feet high, visible at 6 miles, at the western extremity of the breakwater.

There is also a light at the Pharos.

2. Rosetta.

The harbour of Rosetta is at the mouth of the branch of the Nile bearing the same name. The town is about 9 miles from the sea following the course of the river. The river at its mouth is half a mile in breadth, and this breadth continues upwards to a considerable distance. The best water is upon the eastern side, and about half way over, but the depths are only 5 and 6 feet, increasing inwards to 12, 18, and 25 feet, the latter depth at 2 miles inside. A part of the western side of the bar is dry, and there is bad riding within it with westerly winds.

On the west side of the Rosetta mouth is shown a revolving light, red and white alternately every 5 seconds, elevated 175 feet above the sea. (*Sailing Directory for the Mediterranean Sea.*)

3. Damietta.

This harbour, once the emporium of Egypt, like the similarly situated Rosetta, has declined very much since Alexandria has risen in importance. The town is on the right bank of the eastern or Damietta branch of the Nile, about 10 miles from the bar. The bar itself has less than 6 feet of water on it at low Nile, and the outward current is very violent during the inundation.

On the eastern side of the entrance to the Damietta mouth, is a revolving light, attaining its greatest brilliancy every minute. It is at an elevation of 176 feet above the sea. (*Sailing Directory of the Mediterranean Sea.*)

Colonel Le Messurier (1851) states :—" Damietta is situated on the right or eastern bank of the Nile at the point where it makes a remarkable bend; it is 7½ miles from the sea. It is one of the largest towns in Egypt; its houses are well built, and it has a population of 30,000.

" From Damietta to the Boghaz Forts there is a good road on the right bank of the river on a raised causeway for 3 miles, whence it skirts Lake Menzaleh and passes through the cultivated lands near the village of Doorgham to the Fort of Lesbeh and the village of the same name which is about 500 yards further to the north. This road during the inundations is flooded partially by Lake Menzaleh, and for 3 miles near Damietta it is much intersected by deep canals cut from the river. It could be rendered impracticable for guns by cutting the bridge and dykes across these canals, which are generally 10 to 12 feet deep and 15 to 20 feet broad, with high banks 6 to 10 feet above the level of the ground.

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"The date groves from Damietta extend to 3 miles on the north and 1½ to 2 miles to the east to the borders of Lake Menzaleh, and many miles to the south.

"There are two landing places on the lake, one east 1½ miles, the other south-east 2 miles from Damietta. The country is highly cultivated between the lake and the town, and in June and July extensive rice grounds render that part a great swamp and fever prevails in consequence.

"There is also a road to the Boghaz by the left or western bank of the river; it proceeds from the village of Seneneeyah for 1½ to 2 miles; it passes through date groves, when it enters on a sandy and deep track; this is avoided during the dry season, from February to July, by passing over some pasture land which is under water from July to February; but during high Nile the communication by this bank of the river with the Boghaz Fort is either over difficult sands, or by a considerable detour to the westward over perhaps a worse road.

"The river is always navigable. In winter vessels anchor outside the bar to the north-east about 2¼ miles from the western Boghaz Fort near the main channel, where, owing to the accession of water from high Nile, there is sufficient depth of water for coasting craft. In summer the anchorage ground is to the north-north-west 2½ to 3 miles from the western Boghaz Fort. The main channel of the Boghaz is north-east, 2 miles from western Boghaz Fort, and has (in June) only 3½ to 4 feet water. The small channel lies nearly due north from these forts about 1½ miles; it has only 2 feet of water over the bar. In the offing there is in June only 4 fathoms of water.

"The surf over the bar during the northerly winds of summer even is heavy, and during winter it is often impassable. A considerable change takes place in the shore between the Boghaz and the two forts at its entrance at different seasons."

X.—TOWNS AND HARBOURS IN THE RED SEA.

1. Massowah.

(*Population 2,000.*)

This is the chief place of export from Abyssinia, and is about 300 miles north-west of the Straits of Bab-el-Mandeb, and 400 from Aden. Massowah itself is an island connected with the mainland by low wet ground about a mile in length. The navigation is simple and easy until nearing Massowah, when the numerous islands called the Dhalac group, and many coral reefs, make great caution necessary and daylight to be desired. Massowah being an island, the anchorage is well protected from the prevailing strong breezes by being in the channel between it and the mainland. There is abundance of water in the centre, and the channel is fully 600 yards across, but on the northern mainland side a coral reef extends a short distance from the shore. Eight or ten of the largest ships, with double the number of small ones, could be securely moored in the harbour, and there is a pier with facilities for landing on the island. The water-supply is from tanks in the island. This might probably be increased by digging wells on the mainland.* The entrance is from the north-east, the other end of the passage being closed for shipping of any draught by coral rocks. At the entrance of the channel on the left is a small round tower, which can scarcely be dignified by the name of a fort. Near this some guns are mounted on the ground. One thousand Egyptian artillerymen and infantry were located close by in 1867. The island has been handed over to the Egyptians by the Turks. The new garrison is much larger than the old one, and eight fresh guns, supposed to be long 12-pounders, in excellent order, have been added to the previously existing four small old rusty guns. The island, which is small, is nearly covered by official buildings and a cemetery. The Kaimadan, or Governor, has a tolerable house, but the merchants live on the mainland, 3 or 4 miles inland, and merely visit Massowah in the morning for business.

The climate during the cold season, from the beginning of November to the end of March, is pleasant enough, but the remaining months are very trying, often dead stagnation of atmosphere, with not a breath of wind, and great dampness in the air at the same time. There is also a good harbour called Daha-leah, larger than Massowah, about a mile to the north. The water here is also quite smooth. There is also a fresh water supply at this place.

A caravan road leads from Massowah to Khartoum, at the junction of the Blue and White Nile.

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* The following is extracted from "The Record of the Abyssinian Expedition," compiled by order of the Secretary of State for War, &c., War Office, 1870:—

"The officers of the reconnoitring party, despatched from Bombay on the 16th of September last year (1867), having on the 2nd of October examined the port of Massowah, and the water-supply of that port on the plains of Nuicculloo, five miles distant from the sea, formed the opinion that the harbour was too small to accommodate more than half-a-dozen vessels, and the water-supply was of too limited and precarious a nature to meet the requirements of the expedition."

2. ANNESLEY BAY.

The harbour used during the Abyssinian Expedition. It is a short way south of Massowah. For an account see the records published by Major Holland, C.B., and Captain H. Hozier, in 1870.

3. SUAKIN.

(*Population 4,000.*)

Suakin is a town of some size, doing a considerable trade with the opposite coast. The harbour is very small, the approach being by a very narrow channel 20 miles long, studded with dangers, and there is no outer anchorage. The thermometer in May ranges from 89° to 91°, in June from 93° to 97°. There is much less vegetation than at Massowah. Water is procured from wells. From Suakin a caravan road leads to Berber, on the Nile, and there is telegraphic communication along the same line and on to Cairo.

4. BERENICE.

The best passage to Berenice is between Macour Island and the mainland; coral reefs exist on the edge of both, and rocks also on the mainland side, but between them is deep water and a channel quite 2 miles broad between the reefs. After running 7 miles through this channel about west-south-west open water is reached, but it is advisable to clear the dangers in Foul Bay then right ahead, to run up north-north-west 5 miles, which brings a vessel within about 2 miles of the coast, along which she would then run nearly west 6 miles further to the sandy spit at the last entrance of Berenice harbour. There is deep water the whole way, no danger whatever excepting a coral reef, which extends a short distance out from the spit, but is clearly perceptible from a ship's deck. The actual harbour of Berenice is a creek, running about north-north-west, having the mainland on the west side and the sandy spit on the east. It is more than 2 miles wide, extends with diminishing breadth for nearly 3 miles, and is most perfectly protected. On the eastward of the spit is a large bay with deep water, beyond that the mainland tending eastwards to Ras Bunass, having a range of hills running parallel to the coast line. On the north of the bay and the creek, the same range completely shelters the anchorage. On the west the mainland runs nearly north and south, with high mountains a short distance inland, while the south is protected from all swell by the reefs in Foul Bay. No better refuge could be found on any part of the coast. The entrance by day is most simple and easy, and with a couple of light-houses, steam-vessels would be able to enter

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at any hour of the night. There are low hills close by, backed by a very high range, the latter distant not more than 20 or 25 miles. This range appears to end suddenly or to tend westwards a short distance to the north, and trees apparently of the mimosa species are visible up a very considerable valley, in which Colonel Merewether had no doubt water would readily be found.

There is a small water-course which joins a creek just behind, and rather below the ruins of the ancient town. The only one objectionable point is the landing. A coral reef runs along the shore at a distance of 400 yards. Beyond this no boat can go; but there would be no difficulty whatever in overcoming this. A pier could be made with the greatest possible ease, and in a very short time, with the coral itself, which abounds there; and immediately outside the reef is abundance of water, seven fathoms deep, enough for shipping to come up to the pier head. The harbour of Berenice is naturally well protected, and being so far down the Red Sea, is almost clear of those strong northerly winds, which, combined with rocks, make the upper part so dangerous of navigation.

From Berenice a road leads to Coptos on the Nile, passing through the Wadee Sakayt.

5. Cosseir.

The town of Cosseir is situated immediately on the sea-shore; landing is easily effected by means of a very fair wooden pier 80 yards long. There is in reality no harbour, only an open roadstead, protected somewhat from the north-westerly winds and swell by the coast running round slightly to the eastward to a point at the extremity of which is a coral reef extending a short distance farther out. Within this point and reef is another coral bed, ending abruptly, and running in a straight line for about 400 yards at right angles to the shore immediately opposite the custom house. Along this line country vessels lie, moored stem and stern. At 200 yards farther out, and still protected somewhat by the point, is good anchorage in seven fathoms. But should strong winds from south-east, south, or south-west set in, the position would be a dangerous one, being utterly unprotected in those directions. The climate is excellent, a sea breeze always prevailing, and the thermometer is never known to exceed 90° Fahrenheit. There is but little sickness in the town. The want of good water at Cosseir is a great drawback. Drinking water has to be brought from a place 24 hours distant.

The town itself has all the appearance of having been once a well-to-do and flourishing place. The Governor's house, which forms also the

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custom house, is a large quadrangular building with upper storey and open courtyard in the centre.

The other houses are all built of stone, sandstone, or chalk from the neighbouring hills; and the streets, which are kept scrupulously clean, are regular, and at short intervals run at right angles to each other. There are a considerable number of shops in the bazaar.

From Cosseir roads run to Keneh on the Nile, to Cairo direct *viâ* the convents of St. Anthony and St. Paul, and along the coast to Suez. Cosseir is also in telegraphic communication with Cairo *viâ* the Upper Nile.

About 500 yards to the south of Cosseir a large water-course flows into the harbour. The space between this and the town is 1,200 to 1,400 yards wide and perfectly level. The best position for a camp would be on the high ground north-west of the town and fort. There are wells north-north-west of the town on the direct road to El Bayda.

Colonel Le Messurier (1850) says :—" The importance of Cosseir is naturally great, as being the only port of Upper Egypt and the entrepôt of the trade with Arabia; but the town is small and ill-built. It has, however, considerably increased of late years. But the total absence of good water and all means of supporting itself by cultivation makes it dependent entirely on the Nile for every article of consumption, even to the smallest necessaries of life. There are several wells of very brackish water to the north-west of the town, which, though only fit for camels, the generality of the inhabitants drink. The better classes, however, drink rain water, collected at Cosseir at much cost and pains, or brought from the mountains two and three days' journey distant. Several camel loads of water are daily brought from the neighbourhood of El Bayda or Bir Inglese, from a place called Nukhaillie, distant about 11 miles from Cosseir, and situated about 4 miles north-east of El Bayda. The water is of the same description as from the wells of that place, both being supplied from springs. The supply is plentiful. Between the wells of El Bayda and those of Nukhaillie is a fine open plain where an army of 20,000 men might encamp.

" The Fort of Cosseir is the old one, much in the same state as Sir David Baird's expedition found it in June 1801. It is a square of about 75 yards, with towers at the angles, and a rude description of ravelin thrown out in front of the gateway; it is situated on a low ridge to the north-west of the town, which it commands as well as the harbour. There is a well of brackish water in the fort. The town walls are within 10 yards of the ravelin. There is a half-filled-up ditch round the fort, which mounts 15 to 20 guns of small calibre.

XI.—CAIRO AND ENVIRONS.

(Colonel Le Messurier, 1850.)

Cairo is situated in latitude N. 30° 3′ 20″, and longitude E. 31° 18′ 15″, 15 miles south of the point of the Delta, and immediately to the west of and under the Mokattim range of hills which run north and south and entirely command it. It is a walled town built on the alluvial soil deposited by the Nile. Its form is nearly rectangular, its greatest extent from north to south being 3 miles, and its breadth east and west 1½. Its elevation from the Mediterranean does not exceed 50 feet, and its distance from the river 2,400 toises. The houses are built on a gently inclined plain rising towards the east, or the hills, on an offset of which the citadel is seen towering imposingly over the town. The houses are miserably built though picturesque.

The town is divided into two nearly equal parts by a canal passing through it from south to north. This canal leaves the river near the main aqueduct head at old Cairo, at the south-west angle of the old city; it fills all the reservoirs of the town, is about 20 feet broad, and so completely bridged over as to be difficult to trace. As soon as the Nile subsides, it stagnates and dries up, becoming a receptacle for the filth of the town, and producing malaria and sickness. Every house has a well, but being supplied by filtration through nitrous soil, the water is hard and brackish.

The walls of the town to the east and north date far back, are tolerably well built, and 25 to 30 feet high; those to the south are insignificant; to the north-west there are none. There are more than 60 gates to the city.

In the interior of the town there are many gardens attached to palaces and private houses. The public places of resort are the Rounneyheyeh, or horse and cattle market, the Karameydan at the foot of the citadel, which is of considerable extent; the Eshankieh to the north-west of the town, which is a spacious garden with avenues of large trees.

The streets of Cairo are narrow and irregular. There are three which pass through the entire length of the town, of which the centre one is the longest; they are called sharah. The transverse streets generally lead to the citadel running east and west; they are called sicca or derb;

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and the alleys, which are numerous, are known as atfeh. The streets and alleys vary from 5 to 50 feet in breadth, and none of them are paved. They are generally damp, either from infiltration from the river or from watering. The sun seldom penetrates into them.

The bazaars are numerous and good, and there is a separate one for every trade. The population is about 300,000.

The citadel is separated from the town and outside the walls. It is built at a considerable elevation on an offshoot from the Mokattim hills, and is of very irregular figure. The walls follow the trending of the ground and rock, which in many places have been scarped to give them greater elevation. The walls themselves are about 40 feet high, but their actual height from the ground below varies from 75 to 80 feet on the western face, where they are the highest; on the other faces they vary greatly, according to the irregularities of the ground. These walls have circular and square towers at irregular intervals; in some places sand and rubbish have accumulated 15 or 20 feet at their bases, making the ascent not difficult.

The citadel completely commands the town, and is itself as completely commanded by the lower terrace of the Mokattim hills as that terrace is by the one above it. The lower terrace is 220 feet above the citadel, and only 440 yards distant.

The interior of the citadel is filled up with large and extensive buildings, the north-east angle being alone appropriated to barracks. There are two gates. The main or old gate leads to the Rounneyheyeh. The new gate leads to the east and to the new causeway which communicates with the redoubt on the lower terrace of the hill beyond. The terreplein of citadel above the plain below varies between 80 feet on west and south to about 30 feet on east and north.

The only battery mounted on these works faces the town; it is close to the grand mosque and has 13 guns of various calibre. There are on the western, southern, and eastern faces 24 casemate embrasures, and about 10 others on the north-western side.

The supply of water is ample, and an aqueduct conveys it from the Nile; it is in daily operation. Besides this, the supply from Joseph's well would suffice for the garrison.

There are generally two regiments of infantry stationed in the citadel.

The environs of Cairo are remarkable. The Mokattim range of hills approach the citadel to within 220 and 440 yards. From the latter point on the north they gradually recede, and at 1½ miles they terminate near the "Red Hill" near the Pasha's new palace at Hasswah. To the south the range gradually recedes towards east for five miles, when it sweeps round in that direction and forms, with another range to the south, the Valley called the "Bahr-be-la-ma," or what is commonly known as the "valley of the wandering." These hills are distant from the river 3,770 yards. The intermediate space on the south of the town is filled up with ruins and mounds. South of these mounds is a low table-land covered with a profusion of windmills. To the west it is precipitous, and partially so to the south, and 30 to 40 feet high. It slopes gradually to eastward. Still further to the south is the village of Bassatin, situated on a slight eminence, with the desert on the east and a swamp on the west. The approach from the south to the citadel and Cairo is well covered, and the various localities, the mounds, tombs, &c., would form very defensible positions for both assailants and defenders. From the table-land or windmill-hill an advancing force from the south would be much exposed. The Mokattim hills do not command the river, but this table-land does so most completely at 800 yards.

To the north of the citadel, the ground between the hills and the town is more confined and more densely covered with tombs, mosques, and stone enclosures than on the south. The mounds on this side are less extensive and less elevated than on the south, and are confined to a strip between the town-walls and the tombs, but they would afford advantages to troops equally with those on the other side. The base of the Mokattim hills to the north-east and partially to the south is extensively quarried, and the ground broken and cut up.

Directly to the east of the citadel a causeway leads up to the redoubt on the lower terrace of the range, and an excellent cut road to the quarries passes up the valley and winds up the recess to the east of the redoubt to the same place, and a road proceeds from the head of this recess and leads to the upper terrace or the crest of the Mokattim range, and thence passes over the table-land to the eastward and joins the southern road to Suez near the coal-shaft. From the redoubt there is also a road which leads to the south along the lower terrace at the entrance of the valley "Bahr-be-la-ma," and joins the above-mentioned road. Both these roads are practicable for guns, even a siege train.

Passing round by the northern face of the town from the neighbourhood of the Pasha's palace (called Hasswah), an excellent made road leads to the Bab-el-hudeed, or iron gate, and thence to the gardens of the Eshas Keeyeh. The ground to the north is extensively cultivated

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and intersected by numerous canals from the Nile, both large and small. The lines of an infantry regiment are situated about half-way between the palace and the Bab-el-hudeed.

To the north of this gate are the gardens and palace of Shoobra, four miles distant; a fine road leads to it under an avenue of acacias and sycamores. Boulak, the port of Cairo, is about one and half miles from this gate; it is an active and bustling place, has a very good iron foundry for the repair of steamers, and a very creditable dockyard. At Boulak all the steamers lie. Proceeding south from Bab-el-hudeed the entire western face of the town as far as the river is occupied by a spacious garden and handsome palaces covering the space between Boulak and old Cairo.

Old Cairo occupies the space between the head of the great aqueduct and Attar-el-Nebbee. The Island of Rhoda is to the west of the aqueduct head, and immediately beyond it, on the western bank of the river, is the large village of Ghiza, where there is a large military school of instruction for cavalry.

XII.—SUEZ CANAL.

In reporting upon the Suez Canal, the total length may be divided into eight sections according to the different physical conditions of the country through which it passes.

A.—Nature of the Banks.

The following table shows the nature of the soil throughout the various sections:—

(1.)	Lakes Menzaleh and Ballah. This distance includes two short cuttings of 3 miles ...	Sand.
(2.)	Cutting of El Guisr* (8 miles) ...	Sand.
(3.)	Lake Timsah	
(4.)	Sérapéum† and Toussoun‡ cuttings (5½ miles)	Sand and a thin layer of gypsum.
(5.)	Exit from Bitter Lakes	Tenacious soil, with upper coating of sand.
(6.)	Bitter Lakes	

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* El Guisr ... ... 70 to 100 ft.
† Sérapéum ... ... 30 to 40 ft.
‡ Toussoun ... ... 15 to 20 ft.

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(7.) Cutting of Chalouf* (4 miles)	... Tenacious soil and rocks, with upper coating of sand.
(8.) Plain of Suez	... Tenacious soil.

With the exception of about 2 miles on the eastern side of the canal at the south end of Lake Ballah, nearly the same distance on its western side at the southern extreme of Lake Timsah, as well as throughout the three lakes, there is a solid dry embankment, varying in height from 5 to 10 feet in the flat part, to 50 or 60 in the higher portions.

In 1870, Captain Richards and Lieutenant-Colonel Clarke, in order to ascertain whether the passage of large ships might not at times be checked and delayed, made a careful examination of the Sweet Water Canal, which runs for many miles parallel to and through the same soil as the Maritime Canal. They found that during the seven or eight years since its formation, though it has been once cleaned out, its section has been but little affected either by the erosion of its banks from passing vessels (and the traffic on it is very considerable) or by any large deposit of sand drift from the desert.

† "With reference to the former (Sweet Water Canal), we found that from the nature of the soil,—and this of course applies to that of the Maritime Canal, which contains lime in large quantities,—the banks below and a little above the water become hard and encrusted, and the ordinary wave or wash from a passing vessel going at moderate speed disturbs the surface but little if at all.

"Observations in the Maritime Canal showed the same results, more especially where the banks were steep and on a good incline, for there it was noticed that as the wave rose and fell, the water coming off them was not discoloured, nor did it bring back with it any sand or mud; but along those portions of the canal, where on either side wide berms or horizontal benching have been left, a little above or below the surface level of the water, considerable agitation of the soil took place, particularly when the vessel proceeded at a speed exceeding four knots, and the wave rolled off the banks heavily charged with detritus of these berms, and much discoloured.

"We regard this in point of construction as the least favourable feature of the entire work, and though in time when the banks shall have assumed their natural sections, this disturbance may cease, yet till then some little silting, necessitating continuous dredging operations to keep the centre of the canal to its normal width and depth, will be the result. Through these parts of the canal, as indeed throughout its entire course, except in the larger Bitter Lake, the speed should never be permitted to exceed 4 or 5* knots per hour, a rate which under all ordinary circumstances ruling the transit of a ship from sea to sea is sufficient to ensure correct steerage."

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* Chalouf ... ... 40 ft.

† Extract from "Report on the Maritime Canal connecting the Mediterranean at Port Said with the Red Sea at Suez," by Captain Richards, R.N., F.R.S., and Lieut.-Col. Clarke, C.B., R.E., February 1870, middle of par. 52, &c.

Since this report was written, stone facings to the banks have been found much needed, now the traffic has increased. It is being done slowly, one-tenth of the whole length having been completed in 1875.

At the Suez and Port Said ends of the canal, at the entrance to the basins, there are two red lights, one on either side.

B.—ARTIFICIAL WORKS.

1. *Light-houses.*

At both the northern and southern ends of the larger Bitter Lake, or, as the French call it, the "Grand Bassin des Lacs Amers," there is an iron pile light-house 65 feet high built on solid masonry. These are eight miles apart, and visible one from another. The lights are of the fourth order. On the western shore of Lake Timsah there is a light-house, and on the northern another slightly to the east of the landing-place for the town of Ismailia. There is also a fixed white light on the western bank of the canal, a short distance from Port Said.

2. *Beacons and Buoys.*

Throughout Lake Timsah, and from where the embankment terminates at the north end of the Great Bitter Lake to the light-house at the north end of the lake, also from the light-house at the south end of the lake, throughout the length of the Little Bitter Lake, to where the embanked canal again commences, the deep channel is marked by conspicuous iron beacons on either side; these beacons are 250† feet apart, and the deep water channel between them is the same in width as in the rest of the canal; but in practice it is found more difficult to keep to the centre while passing through these beacons than it is when between the embankments. The rest of the Great Bitter Lake is marked by buoys every 330 yards, forming an avenue 130 feet wide.

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* 5¾ nautical miles per hour is now the maximum speed allowed, but in passing sidings, &c., vessels must go slower.

† 200 yards, according to Col. Stokes; see "The Great Canal at Suez," vol. i., p. 264.

Bollards are driven at 200 yards apart wherever the canal is bounded by solid bank, to which vessels aground can attach warps for heaving themselves off.

The buoys and beacons are white on the east side of the channel and red on the west.

3. *Waterworks.*

The waterworks for the supply of Port Said and the northern portion of the Maritime Canal with fresh water are at Ismailia. The water is derived from a small canal, branching off from the Fresh-water Canal at a point beyond the Arab village. It is carried all round the town, to which it forms as it were the northern boundary. Simultaneously with the completion of the Fresh-water Canal to Ismailia and Suez, it was found necessary to provide Port Said and the line of works along the northern portion of the canal with a regular supply of water that could be depended on. Two powerful pump engines were accordingly erected at Ismailia, and a double row of cast-iron pipes laid the whole length of the canal to Port Said, a distance of 50 miles, through which water is continuously pumped by steam. At all the principal stations there are reservoirs for storing the water and drinking fountains from which any one can draw, while at every 2½ miles are open self-filling cisterns for the use of man and beast. From Ismailia to Suez the supply of water is drawn from the Fresh-water Canal.

4. *Locks between Maritime and Fresh-water Canals.*

Passing out at the north-east corner of Lake Timsah, the Maritime Canal enters almost immediately the heights of El Guisr. On the left is seen the branch canal which joins the Maritime to the Fresh-water Canal. The difference of level, 17* feet, is adjusted by means of two locks, one just below Ismailia, and the other near the upper part of the town.

5. *Bridges.*

The following bridges are marked upon the map of "The Suez Canal, prepared at the Hydrographic Office, Admiralty, from a French survey in 1869":—

(*a.*) Floating bridge at El Guisr.
(*b.*) ,, ,, Ismailia.
(*c.*) ,, ,, four miles north of Suez.

There is also a floating bridge at Kantara (but it is not marked on the map). It can accommodate six camels at a time.

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* This number is taken from "Murray's Guide," p. 242.

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C.—Dimensions and General Details.

1. *Length.*

The whole length of the canal from the high light-house (at the inner end of the western breakwater) at Port Said to its junction with the Red Sea at Suez, may be stated as nearly as possible at 88 geographical miles. Of this distance, 66 are actual canal, and 22 miles of the navigation run through the three lakes, *viz.*, Timsah and the Great and Small Bitter Lakes. Excavations had to be carried out, however, throughout the whole length of Lake Timsah, of the Small Bitter Lake, and a portion of the Great Lake, leaving a distance only of 8 miles in the latter, where the natural depth exceeded that of the canal, and where consequently none were necessary.

2. *Depth.*

The average depth of the canal is 26 feet.*

3. *Width.*

For the greater part of the canal, *viz.*, where the banks are low —

Width at surface	325 English feet.
Width of floor	72 „ „

The banks slope up at 2 to 1 till within 5 feet of the water surface, where the section is for 50 to 60 feet either level or with horizontal benches, ending in slopes of 5 to 1.

At El Guisr, Sérapéum, and Chalouf, where the course of the canal runs through high ground, and where the labour of removing the soil would have been attended with very great expense and occupied a considerable time, the width has been reduced, *viz.* :—

Width at surface	195 English feet.
Width of floor	72 „ „

Slopes 2 to 1.

It will thus be seen the canal was generally intended to have a waterway 26 feet deep for a width of 72 feet, 20 feet deep for 92 feet, and 15 feet for a width of 112 feet.

4. *Faults.*

In examining the canal in 1870, the officers above referred to made 52 sections to ascertain if the proper dimensions had been adhered to. They found five faults, where the dimensions were less, but when they

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* For soundings throughout the canal, see map prepared at the Hydrographic Office, Admiralty, from a French survey in 1869, at the end of Report above referred to. The deepest water is not, however, always in the centre.

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wrote in February of that year some had been already remedied, and they expected the remainder would be so within three or four months from the time of their visit.*

It must not be understood that there is the exact depth and breadth uniformly throughout the canal which it was the intention of the engineers there should be; but the variations are not greater than was to be expected, nor do they materially affect its practical value.

5. *Curves.*

The curves on the canal are five in number, in passing most of which great care and attention are necessary in piloting a long vessel—

1st.—Immediately after entering the canal from Port Said.

2nd and 3rd.—Between Kantara and El Guisr. The latter, just before entering Lake Timsah from the north, is the sharpest on the canal.

4th.—Near the south end of the Little Bitter Lake, is rather sharp.

5th.—Within 2 miles of Suez.

These curves have been improved since the canal was opened.†

6. *Basins for Ships passing each other.*

At every 5 or 6 miles between Port Said and Lake Timsah, the whole distance being 42 miles, there is a "gare" or siding to allow large vessels to bring up, either for the purpose of passing each other, or to moor for the night. These "gares," which are temporarily marked by posts driven into the banks, are merely extensions of the width of the floor of the canal under water, and are not sufficiently capacious, but they will, it is stated, be enlarged. That at Kantara, 24 miles from Port Said, is exceptionally large, and can accommodate three large vessels. The pilots are, of course, well acquainted with the positions of these sidings. The best stopping places for ships at nightfall, and during sand-drifts or high winds, are the Kantara "gare," Lake Timsah, and the Great Bitter Lake, which are respectively 24 miles, 42 miles, and 56 miles from Port Said.

7. *Tidal Influence and Currents.*

The difference of level of the two seas, so far as it has had any effect in producing a current one way or another, is inappreciable. The tidal observations which were made in 1870 by Captain Richards and Lieutenant-Colonel Clarke show that in the southern portion of the canal, between Suez and the Great Bitter Lake, the tidal influence from the Red Sea is felt,

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* For a description of these faults and diagrams of the sections, see Report on the Maritime Canal, &c., already referred to.

† The 3rd, 4th, and 5th have had a greater width given to them of respectively 42, 32, and 16 feet.—Colonel Stokes' Report.

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there being a regular flow and ebb, the flood running in for about seven hours, and ebb running out for five hours. At the Suez entrance, the rise at spring tides, unless affected by strong winds, is between five and six feet; about half way from Suez to the Small Bitter Lake, a distance of 6 miles, it is under two feet; at the south end of the Small Bitter Lake, a few inches only; while at the south end of the Great Lake there is scarcely any perceptible tidal influence.

D.—Harbours.

1. *Harbour at Port Said.*

Port Said, though affording sufficiently good anchorage for small vessels, cannot be considered a harbour, either in respect of extent or depth, for vessels of large tonnage and great draught of water. It is formed of two rough narrow and low breakwaters, of unfinished appearance, enclosing an area of some 450 acres, with an average depth of only 13 or 14 feet of water, except in the ship channel leading to the inner basins, where the depth is from 25 to 28 feet.

The western breakwater, which extends for 3,391 yards at right angles to the shore, and is slightly curved to the eastward towards its extremity, was commenced in 1860, and carried out about 1,300 feet, beyond which point, and at a short distance from it, was deposited a heap of stones that was surrounded by iron piles, and from its detached position was called "The Island." The work was then left untouched till 1866, when the breakwater was joined to the Island and continued further; it was finished in 1875. From the mainland to the Island, the breakwater is formed on its inner side of a bank of rubble stones, surmounted by a promenade,* over which the springs break with a very moderate north-west wind, and on the outer or sea front of concrete blocks; but beyond the Island to its termination it is entirely constructed of large blocks of artificial stone composed of one part of French hydraulic lime with two parts of sand, some of which were transferred to it from the eastern breakwater. This latter, which is also constructed of large masses of concrete, is of more recent construction; it extends about 2,079 yards, and converges towards the western breakwater.

Both structures are deficient in width, and from the rough way in which the blocks are deposited some amount of silt finds its way through

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* Colonel Stokes, in his Report (see "The Great Canal at Suez," vol. i, p. 257), gives the length of the W. pier at 7,000 feet (in 1874), and says it was resolved to prolong this pier by 600 metres in this year, and mentions a further intended extension of 1,500 metres.

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the interstices, while from their slight elevation, the sea, during fresh north-west winds, washes over them; bringing with it a certain quantity of sand.

It is said, and probably with truth, that it is only during strong winds that the silting up occurs through either cause to any extent. That the current does not always run to the eastward, but, after easterly winds, in the contrary direction, is evident; and at the inner part of the eastern breakwater, where some of the blocks were removed for the purpose of completing the outer portions, thereby leaving a breach, the effect of an easterly current or an easterly wind is plainly to be seen in the sand accumulated.

"From an examination of the French plans, and by our own measurements," says Captain Richards, "the shore has extended seaward along the outside of the western breakwater since 1860, or in ten years 1,220 feet; the action of the current has thus reclaimed in that period, in an angular form, an area of about 45 acres. An inspection of the French diagrams shows that this process of silting has not been uniformly progressive; during some periods, indeed, it has been stationary. The area included within a line drawn from the extreme end of the west breakwater to the tangent of the beach line, about 3 miles to the westward, is 1,400 acres, and from this some idea may be formed as to the remoteness of the time when any practical inconvenience to the harbour will result through the process of silting.

Two proposals have been made for obviating the influx of sand through the western breakwater into the ship channel; one being to cut, parallel with the breakwater, a small trench into which the sand would fall as it came through; the other to dredge the channel so as to keep it always at 9 metres, or 28½ feet in depth, and this it is considered could be accomplished by the employment of a dredger for thirty days in every year.*

It will thus be seen that while there need be no apprehension of difficulty in keeping open the ship channel by either of these methods,

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* The *Times*, of 4th January 1876, says that the upper blocks of the breakwater have been replaced by 800 others, composed of a material more impervious to the insiduous mud-laden current from the west. By the increase of the length of the breakwater, alluded to in a former note, the current has been driven more out to sea. The company brought from France, two years ago, a dredging machine of a special character, made to work in the open sea. With this machine a channel has been cleared in prolongation of the old channel, to the distance of 880 yards. The proposals to form a breakwater further west, to turn the current before it reaches Port Said, is not entertained at present.

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or by the improvement of the breakwaters, which, however, appear to answer the purpose for which they were designed, *viz.*, to afford shelter to the inner basins and canal, there is no obstacle to the formation of a deep-water harbour in the Avant Port, which may be dredged to any depth; but it is doubtful whether such increased depth would be an advantage, as the shoal water protects the inner basins from the sea.

At present a deep channel only, which, as before observed, is to be widened and deepened to 29 or 30 feet, has been opened for the passage of ships; it is not sufficiently buoyed for vessels entering without the aid of a pilot, but will be improved in this respect.

South-west gales are the heaviest on this coast, but being off shore they produce no sea. North-north-west are the prevailing winter winds, but they are not often heavy, and the breakwater affords protection from them. The summer winds are north-east, namely, right into the port and though they seldom blow with great strength, yet they generally send in sufficient sea to prevent dredging operations. November is said to be the quietest month, and it is calculated that the dredging, already alluded to, will always more than suffice to ensure the necessary depth in the channel of Port Said. "During our stay in February," says Captain Richards, "a strong north-east wind set in on one of the mornings on which we went out in the steam tender to examine the entrance. It is probable that a vessel drawing 23 feet of water would on this occasion have touched the mud with her keel; this breeze was, however, but of a few hours' duration, and the same strength of wind would probably have prevented a vessel of similar draught from entering the harbour of Alexandria."

From this and subsequent examinations it appears quite certain that no shoals have been formed, and no decrease has taken place in the depth of the water near the pier ends since the completion of the breakwaters.

It may be well to mention here that the shoal on which two of our ironclad ships grounded, on the occasion of the opening of the canal, was entirely caused by the deposit of the soil dredged from Port Said; it is shown on the chart, and the marks for clearing it sufficiently described in the nautical directions.

There is a small light exhibited on each of the pier ends, red on the western, green on the eastern.

Port Said light-house itself stands at the inner entrance of the western breakwater. It is a grey-coloured octagonal-shaped tower, constructed of concrete, 180 feet high, exhibiting an electric light flash-

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ing every three seconds, visible at a distance of 25 miles, and it forms a noble beacon by day or night. At the outer end of the basins are two white lights, one on either side, and at the inner end are two similar red ones. The harbour can contain from 50 to 60 large vessels.

The inner basins are spacious, occupying an area of 137 acres, with a depth of 27 feet; they can be dredged at all times without difficulty, and are capable of indefinite extension either on the western or eastern sides, especially on the latter, where they would be even more sheltered than the present western basins.

2. *Harbour at Suez.*

The following data are taken from reports of Her Majesty's Consuls, No. 1, 1873, p. 43:—

The natural harbour of Suez, known as the Suez Roads, is the best harbour in the Red Sea. It is formed by a spacious bay, which bites 4 miles in to the land to the west, just south of the town, and is so ample that it would contain a thousand ships of any draught and tonnage, and so safe from winds and currents that, within thirty years, no accident has happened to a ship in it. The greatest length of the harbour is about 8 nautical miles in a direction north-east and south-west. The headlands at each extremity of the bay, 15 statute miles (12½ nautical miles) apart, measured along the shore, are, on the south, Ardabieh Point, and on the north, the Suez Hotel. A gravelly sand-covered spit, a mile wide at its commencement, and tapering to a point, runs from the hotel and south side of the town for 2½ miles, closing in the harbour for that distance on the east; 1⅓ miles south of its point there juts out from the Arabian shore a tongue of land called Gâd-el-Marákeb, with its extremity in a line south of the Suez Hotel, and it is this tongue of land which practically closes in the harbour and forms the north limit of its entrance. The opening across, from the point of Gâd-el-Marákeb to Ardabieh Point, is about 4 miles north-north-east and south-south-west. The channel of entrance to the anchorage through that opening is north-north-east half north and south-south-west half south, and affords a free passage for the approach from the south, which all ships must take, of 1¼ miles wide. Between the east side of the spit mentioned and the Arabian shore north of the tongue, the sea flows up to before the town of Suez, offering a passage, and along the north face of the town, berthing places for small steamers and light craft, and afterwards expands into the lagunes which terminate, 5 or 6 miles further on to the north, the Gulf of Suez.

The harbour is thus exposed to southerly and south-easterly winds only, which prevail at intervals during the winter, but are rarely violent. The depth of water over the whole area of the harbour varies from 4 to 9 fathoms, excepting on some small patches marked on the chart; a large one in the centre, forming the western limit of the channel of entrance to the anchorage, being buoyed. On this patch of coral rock and hard sand His Highness the Khedive, with the intention of erecting thereon a fort which, in connection with another on Gâd-el-Marákeb and a third on Ardabieh Point, would have completely commanded the Suez Roads, caused to be lodged a quantity of stone from a quarry on the Ataka range, opened in connection with the works at the new fort, and although the work has been discontinued in deference to the views of the Porte, a small island has thereby been formed, which now serves as a more permanent mark indicating the shoal.

The bottom of the harbour affords good even holding ground, and at the anchorage there is a depth of water varying from five to seven fathoms. Ships get into and out of the harbour with safety in all winds at all times of the tide by day or night.

The port of entry at the Suez terminus of the Maritime Canal is easy of access. A breakwater protects the canal entrance from southerly winds, and a basin is in progress of construction by the Company. The Egyptian Government works at Suez are likewise extensive; they consist of a dry dock 416 feet long, with a width of entrance of 78 feet, and a depth over the sill of 22 feet at low water and 28 feet at high water springs. The *Forte*, one of our largest frigates, and the *Jumna*, one of the large Indian transports, have lately been docked there; there are also two capacious basins, a naval and a commercial one; the former is nearly finished, and admits the largest ships of the Peninsular and Oriental Company to lie alongside, with a draught of 21 feet 6 inches; a single dredge in a few days would render it available for the Indian transports. The commercial basin is in a less complete state, but will probably be finished in the course of 12 months, when nothing will be left to be desired in respect of basin and dock accommodation at this place.

There is a large red* revolving light at the extremity of the spit (? breakwater) on the Asiatic or eastern side of the entrance to the Suez roadstead, which is so placed as to lead vessels straight up to the anchorage without having to alter their course for many miles before they reach Suez. It is indeed a straight course from the light-house on Zefraneh Point, a distance of 50 miles from the Suez Roads. In going from the quay at the town of Suez to the harbour, the entrance to the Suez Canal Company's port is passed on the right. It is marked by a white light. Next on the same side comes the Waghorn quay, on the point of which there is a green revolving light corresponding with the similar red on the other side, above alluded to. Captain Richards, on the map accompanying his report, shows a light-vessel some distance south of the green light at the extremity of the spit. Consul West, however, reports as follows in Consular Reports No. 15, 1874, p. 737:—"It has been decided to remove the Suez light-vessel from its position at the entrance of Suez Roads, and to place it on the shoal patch reported by Captain Nares, and referred to in my previous report. . . . . . The alteration in the position of the light was effected on the 31st day of December 1873." At the entrance to the canal itself are two red lights.

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* Captain Richards, in the plan accompanying his report, shows this as a green light, and one opposite on the western shore, at the extremity of the Waghorn quay, as red, exactly reversing matters as shown by M. Lesseps on his map.

E.—TELEGRAPHS, ROADS, &c., CONNECTED WITH THE CANAL.

1. *Telegraphs.*

There is telegraphic communication all along the Maritime Canal from Port Said to Suez, also from Ismailia to Zagazig, and so on to Cairo, and from Suez to Cairo direct.

At Kantara the line of telegraph to Syria crosses the canal.

2. *Railway in connection with Suez Canal.*

There is a line of rail running parallel to the two canals, and to the west of both from Ismailia to Suez; there is also a direct line of rail between Ismailia and Cairo. At the town of Zagazig, 40 miles west from Ismailia and about the same distance north of Cairo, is the Alexandria junction of the line.

3. *Roads.*

At Kantara the road from Cairo through Salahieh to El Arish and Syria crosses the canal. This is the principal route for caravans going to Syria. The direct road from Cairo to Syria crosses a little north of El Guise, and joins the former before it reaches El Arish.

At Ismailia a road runs to the canal from Zagazig, following nearly the line of the Fresh-water Canal.

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Four miles north of Suez the road used by caravans going to Mecca crosses the canal.

At Suez roads come from Cairo direct, and also one from El-Tel-el-Kibir and Zagazig.

F.—Methods of closing the Canal, &c.

The best place to scuttle a ship for the purpose of blocking the canal would be in one of the cuttings mentioned on page lxxiii.

Consul West in his report (Consular Reports No. 1, 1873, p. 71) gives as his opinion that a sea-going vessel of the smallest tonnage, duly prepared and scuttled, would block the passage to ships for several days at least. As a means of preventing such a thing happening on the eve of hostilities, he suggests—

(1.)—That all vessels before entering the canal should enter and clear at their respective consulates at Suez and Port Said. Turkish and Egyptian vessels to obtain passes from their respective authorities.

(2.)—That in addition there ought to be floating booms, or some such contrivance, at each entrance to the canal, to be opened by the Agents of the Canal Company only.

These expedients Mr. West considers would prevent irregular ships from entering. The best places for keeping dynamite and stores for blowing up and removing a scuttled ship are naturally Port Said, Ismailia, and Suez.

Extracts from Report by General Macdougall,—Horse Guards, 16th June 1876.

The Suez Canal may be described in general terms as a waterway through a chain of inland lakes which are joined together by cuttings through the intervening ridges.

The canal channel through the lakes can easily be protected by gun-boats from being injured by open attack.

But the dangerous portions are the cuttings, of which there are six, *viz.*, enumerating from the north, Kantara, El Ferdane, El Guisr, Toussoun, Sérapéum, and Chalouf. Here the width at water-line is only 64 yards, while the width of the actual channel is only 24 yards.

The highest ground along the canal is the centre near Ismailia, where the canal passes through a cutting 6 miles long which joins Lake Ballah to Lake Timsah. The plateau of El Guisr, through which this cutting was made, has an elevation of from 60 to 120 feet above the sea, and evidently formed the ancient "divide" between the Mediterranean and Red Sea.

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The three cuttings between Ismailia and Suez, *i. e.*, on the southern half of the canal, are of comparatively minor importance.

First Section.

Port Said to Kantara, 28 miles.

This is the most important section in a military point of view. The canal runs from its northern terminus at Port Said for a distance of 27 miles through Lake Menzaleh, the width at the water-line being 328 feet.

The portion of Lake Menzaleh which is thus cut off by the canal on its eastern side has been entirely drained by the canal, and presents a hard surface for the march of troops over the old bed of the lake.

Beyond this old bed of Lake Menzaleh, however, extends the ancient plain or basin of Pelusium, through which the old Pelusiac branch of the Nile found its way to the sea; the neighbourhood of the mouth of this old Pelusiac branch is marked by Fort Tineh, and by some old ruins said to be the site of ancient Pelusium.

This plain of Pelusium is now a sort of salt-marsh, full of shifting quicksands, and its surface is impracticable for troops. It is separated from the Mediterranean by a strip of hard beach from 100 to 200 yards wide, over which the sea breaks in high northerly gales, and washes into the swampy plain beyond.

Returning now to Port Said, the line of the canal up to within two miles of Kantara is protected on the west by the large sheet of salt-water called Lake Menzaleh, which extends as far as Damietta. The lake is separated from the sea throughout its whole northern front by a narrow strip of hard beach, similar to that which constitutes the break-water to the basin of Pelusium, in which are several openings where the sea finds passage; but the water in the lake is so shallow—in some places not more than 12 inches—as to be impracticable for boats, except in certain portions, at any season of the year.

Port Said itself (population about 13,000) is the safest and most easily approached harbour on the north coast of Egypt. The harbour capacity is about 450 acres, the average depth of water being only from 13 to 14 feet. It is only in the ship channel that the depth is 26 feet, but the channel being only 72 feet wide at the base, barely affords room for two ships to pass one another. Port Said is at present undefended by any works, and is entirely dependent for its water-supply on the forcing engines which have been established at Ismailia, 50 miles distant.

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Kantara, the southern limit of the section under consideration, is of great strategical importance.

Kantara is at the highest point of the chain of low sand-hills which interpose between Lake Menzaleh on the north, and the small inland lake of Ballah on the south. The cutting between the two lakes is about one and a half miles in length. The name Kantara, signifying in Arabic *bridge* or *ford*, indicates its position as the point where, from a period a thousand years before the exodus of the Children of Israel, the lakes and shoals that intervened between the Syrian desert on the east and the Egyptian desert on the west were crossed. The road leading by Kantara was one of the greatest highways of the old world, and served as the route for succeeding armies of Egyptians, Assyrians, Persians, Greeks, Romans, Arabs, and French. At the present time a floating bridge ferries over the canal at Kantara the traveller with his camels passing between Egypt and Syria.

The road from the coast near Pelusium or from Katieh, to Kantara, is crossed at the distance of 12 miles east of the latter place, and nearly at right angles by a range of heights which extend north as far as the swampy plain of Pelusium, and south as far as the eye can see, and afford one of the strongest defensive positions it is possible to imagine.

SECOND SECTION.

Kantara to Ismailia, 21 miles.

Between Kantara and Ismailia the canal passes through the two shallow lakes of Ballah, separated by the low sandy heights called El Ferdane, through which the cutting for the canal is about 4 miles long.

On leaving the southernmost of the lakes Ballah, the canal enters the cutting 6 miles long, through the heights El Guisr, which formerly separated Lake Ballah from Lake Timsah. These heights have an elevation of from 60 to 120 feet above the sea.

Ismailia, the southern limit of the section under consideration, is situated on the western shore of Lake Timsah, and is a place of great strategical importance, as is shown by the following facts :—

Ismailia is near the junction of the Cairo–Ismailia and Suez–Ismailia railways, as well as of the Cairo–Ismailia and Suez–Ismailia sweet-water canals.

The actual railway and canal junctions are at Nefiche, about 2 miles west of Ismailia, from which point a short branch railway runs to Ismailia, and a branch canal runs also to the latter place and into the Maritime Canal.

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At Ismailia also are the water-works and pumping engines, by means of which Port Said and the intervening canal stations are supplied with fresh water, pumped through a double row of cast-iron pipes.

At all the canal stations are reservoirs for storing the water; and at intervals of 2½ miles are self-filling cisterns for the use of man and beast. At Port Said is a reservoir holding three days' consumption of water for the population.

The route from Pelusium by Katieh to Ismailia is four marches long, and is crossed by an extension of the same range described in preceding page as covering Kantara and affording very strong defensive positions. But the occupation of any advanced position covering Ismailia would be rendered unnecessary by the construction of an entrenched camp at the latter place.

The Ismailia camp would also intercept the march of an enemy supposed to have landed at Suez by the most advantageous route he could select for reaching Cairo, now that the opening of the Sweet-water Canal has provided a good road for the march of an army alongside the canal, thereby giving all the advantages of the desert in respect to immunity from inundation, and all the advantages of the cultivated country in respect of supplies.

THIRD SECTION.

Ismailia to Suez, 51 miles.

Between Ismailia and Suez the canal passes through Lake Timsah, which is joined on to the Bitter Lakes by the cuttings of Toussoun and Sérapéum, about 6 miles long, through sand-hills from 15 to 21 feet high. The extreme length from north to south of the Bitter Lakes is 25 miles. The canal then passes through the Chalouf cutting (6 miles long, 20 to 25 feet high) into the plain of Suez, through which it runs for a distance of 10 miles before reaching its southern terminus.

Throughout the whole of this section, the Maritime Canal is bordered by the railway and Sweet-water Canal from Ismailia to Suez, and the country between the two canals will soon be converted into a garden through the agency of the Nile water.

Suez is entirely dependent for its fresh water-supply on the Sweet-water Canal, which, leaving the Nile at Cairo, runs for the most part by the side of the railway between Cairo and Nefiche and Nefiche and Suez. This canal is now navigable for barges all the way between Cairo and Suez, but its capacity is being enlarged, so as to accommodate a larger class of vessels.

XIII.—FRESH-WATER CANAL.

In intimate relation with the Maritime Canal is the Fresh-water Canal, called by some the canal of Ismailia, for the first part of its course, namely, from the Nile, near Abassieh, to the point some 9 miles east of Zagazig, where it joins the old Wâdy Canal. The Fresh-water Canal leaves the Nile at Boulak, and pursues a north-easterly direction, past Belbeis, to the junction above mentioned; it then flows almost due east to Ismailia, where it is connected with the Maritime Canal by a short branch; from Ismailia it turns suddenly in a southerly direction, and runs in a line paralled to the Maritime Canal, along its western bank, to Suez. The level is about 20* feet above that of the Suez canal, to obviate which there are two locks (already mentioned,) at Ismailia; the same difference of level between it and the Red Sea is remedied by means of four locks between Nefiche, where the small branch above mentioned turns off, and Suez. There is also a lock at Boulak between the Fresh-water Canal and the Nile. The width of the canal is 16 feet, and its average depth of water at high Nile is 6 feet and at low Nile 3 feet. Captain Richards, in his report, gives the depth at about 4 feet, and the Rev. Mr. Badger from 3 to 4 feet.

The Fresh-water Canal is navigable throughout, and in 1865, by means of it and the channel already dug from Port Said to Lake Timsah, water transit between the two seas was begun. During the Abyssinian expedition extensive use was made of this route for the conveyance of stores.

This canal was originally made for the purpose of supplying the labourers on the Maritime Canal with water, and at present, as described on page lxxxviii, it supplies sweet water for the whole distance from Port Said to Suez.

Bridges.

At Cairo there are three bridges over the canal, two on roads leading to Boulak, and one on the road to the railway station; and there is a drawbridge at Tel-el-Kibir, east of Abassieh.

XIV.—CANALS IN THE DELTA.

1. Wâdy Canal.

The following account of the Wâdy canal is given by the Rev.

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* Taken from Murray, p. 231.

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George Badger in the Supplement to Sir James Outram's Report, 1862:—"The canal of El Wâdy branches off from that of Moez at Zagazig, but as the former has not been cleared out for years, its bed has risen so that the supply from the Moez runs very sparingly into it, and at low Nile ceases altogether. The Company have lately built a bridge over the smaller canal at its junction with the Moez, and also a lock to prevent the water of the former from flowing into the latter. * * * * Up to the point where the Aboo-el-Akhdar Canal enters that of the El Wâdy the stream of the latter is very sluggish, but from thence it acquires considerable velocity, which is further increased by the El-Meshrafeh, which flows into it a few miles beyond. * * * * The stone bridge which formerly existed here (at Aboo Hammed) has been replaced by a wooden drawbridge erected by the Company to allow of the free navigation of the canal further east." The length of the canal from point to point is about 10 miles.

The original idea was to have made the Wâdy the commencement of the Fresh-water Canal, but as this source was attenuated and liable to run dry from having to pass through so many channels, it was later determined to supply the Fresh-water Canal from the Nile itself at Cairo.

2. *Bahr Moez.*

It is believed that this canal is the ancient Titanic branch of the Nile. It bears the name of the Sultan Moez-Eddin (970 A. D.), who probably restored it. The Bahr Moez originates at Mit Radi, 2½ miles north of Benha, on the Damietta branch, and empties itself into the lake of Menzaleh, near the ruins of the town of Sân. Its total length is 91¾ miles. On its route it passes the important railway junction of Zagazig, and at this point is, as before mentioned, connected by a lock with the El Wâdy Canal. From Zagazig to Sân, near Lake Menzaleh, are several branch canals, but some of them are not navigable except during the inundation time. The main canal, however, is navigable all the year round.

3. *Cherkaonieh Canal,*

The Cherkaonieh Chercawie (Linant's map) leaves the Nile about 3 miles north of Boulak, and connects with the Bahr Moez about half way between its mouth at the Nile and Zagazig. Its navigable length, according to the *Statistique de l'Egypte,* is 8,500 kassaba (18½ miles).

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4. *Chebini Canal.*

The Chebini, a navigable canal, flows from the left bank of the Damietta branch, opposite a large island 12 miles north of the barrage, to the sea at Achetoun, after traversing the whole province of Garbieh. Its course is nearly due north, and it runs in a direction more or less parallel to the Damietta branch all the way. Chebini and Mehallet-el-Kibir are the principal towns on its course; the latter is about half a mile from the canal, but is connected by a short branch. The Chebini Canal is twice crossed by the railway—first by the Alexandria–Cairo line between Tantah and Benha, and, secondly, by the Tantah–Damietta line, near Mehallet-el-Kibir. Its length, according to the *Statistique de l'Egypte*, is 39,200 kassaba (about 81 miles).

5. *Mansourah Canal.*

The Mansourah Canal, or Bahres Sogheiyer, although mentioned as navigable by the *Statistique de l'Egypte* under the name of Bahr-es-Ságis, is said by Murray to contain water all the year, but to be only navigable the whole way during the winter and early spring. Its course is from Mansourah, on the Damietta branch, in a north-easterly direction, past Menzaleh to the lake of that name. The Mansourah Canal is the ancient Mendesian branch. In its widest part, near Mansourah, it is only 70 or 80 feet broad, and below Ashmoon it is much narrower.

Murray says that boats cannot pass into it from the Nile. The canal is very winding, and the banks, which are planted with a good many trees, high. At Mansourah there is a line of rail coming from Zagazig, and on the opposite side of the Nile runs the Tantah-Damietta branch. The length between Mansourah and Menzaleh is given by Murray at 37 miles.

6. *Mahmoudieh Canal.*

The Mahmoudieh Canal completes the connection of Cairo with Alexandria by water, and runs from the Rosetta branch of the Nile, at the village of Atfeh, a short distance below Fooah on the right bank, to the latter town on the sea. It has a total length of 50 miles, with an average width of 100 feet.* At Atfeh there is a lock to prevent the water flowing from the canal into the river at low Nile. A part of its course is identical with that of the ancient Canopic branch of the Nile and the old canal of Fooah. The north bank of the Mahmoudieh is bordered for some distance from Alexandria with the houses and gardens of the wealthy inhabitants of that town. The villa and garden of Moharran Bey belong

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* A contract was taken in 1870 to clean the canal and make it 10 feet deep.

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to the Viceroy, who has also a palace on the banks of the canal, commonly called No. 3 Palace. The earth thrown up from the canal forms an elevated ridge, rising far above the adjacent lands. Here and there, near its banks, are the remains of ancient towns. The terminus of the Mahmoudieh Canal at Alexandria is outside the gate of that name, and is not far from the harbour. The railway station (Alexandria–Cairo line) is about 100 yards to the west of the end of the canal, and the line of rail runs south of it all the way.

7. *Khatetbeh Canal.*

The Mahmoudieh has another feeder in the Khatetbeh, which joins it from above Terraneh, 20 miles north of the Barrage. The Atfeh branch, owing to its low level, is only available during the inundation, after which its communication with the Nile is closed by the lock above mentioned, the Mahmoudieh becoming henceforth wholly dependent on the Khatetbeh for its supply of water. The Khatetbeh, however, is not navigable for a considerable part of its course. The existing mouth of the Khatetbeh* is to be removed higher up, and another mouth has been opened for it from the Nile within the Saidieh, thus placing it in the power of the garrison to close it at any time, and thereby to cut off almost entirely the water-supply of Alexandria. The importance of this strategy is so great as to place it beyond doubt that the measure was one of design on the part of those who planned the fortifications of the Saidieh.

Sir James Outram, in his Report and Minutes on the French Designs in the Red Sea, &c., 1862, p. 95, makes the following remarks on this subject, on the supposition that the French are in possession of Alexandria, and the English are attacking it :—" One of the first measures of the British would, of course, be to fill up the canal at the point selected for their advanced position.† This supply having been cut off, and the tanks once exhausted, the only water procurable would be from wells, but which probably owe their supply solely to the filterings from the tanks and canal, which, considering the numbers dependent on them, could afford at best but a very limited supply ; such as they did afford would be brackish, and by producing diarrhœa, scurvy, and other diseases, tend still further to dispirit the troops and exasperate the population. Vegetables in small quantities could be reared, so long as water could be spared; but all extraneous supply of them or of animal food would be cut off."

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* See map opposite to p. 53 in "Supplement to a Report on Egypt, &c.," by Lieutenant-General Sir James Outram, Bart., 1862. Reports on this subject by Sir J. Outram and the Rev. Mr. Badger, pages 8 and 53 of Supplement.

† Thereby retaining the water of the canal for our own consumption, and for the passage of our boats. Even should the extreme, but most improbable, measure of letting out the water into Lake Aboukir have been resorted to by the enemy, by closing up the outlet, the canal would be re-filled from the Nile for the use of the British

Whether, however, Alexandria is so very dependent on the Mahmoudieh Canal seems to be a question, if the following extracts from Mr. Thurburn's statement given in Appendix No. 27 of the same report be taken into consideration. Mr. Thurburn states:—"Alexandria and its fortifications depend upon the Mahmoudieh Canal for supplies of water. By means of several lines of subterranean passages, easily discoverable, the water is conveyed from the canal to cisterns, most of which are within the walls of the town, and which are supposed capable of containing for one entire year a sufficiency of water for the vessels of war in the harbour, the garrison required to defend the present fortifications, and the whole of the inhabitants. . . . . By sinking wells within or without the town walls, water is invariably found at a depth of a few feet. In our court-yard, which is midway betwixt the old and new harbours, we have water at a depth of 3 feet, the quality of which is the same as that found in the neighbourhood of the town, and although slightly brackish, my opinion is that it could be found in large quantities, and used in time of war most advantageously, being, if I mistake not, less salt than the water to be had in the Suez desert, or that of either Suez or Aden. The specific gravity of the water from the well in our court-yard I have just tried, and, in spite of its proximity to the sea, it was only found to be 1·004. The fall of rain at Alexandria, on an average of the last three years, is 7·217 inches per year. Much of this could be collected from the flat terraces of the houses, at a small expense of money and labour. Under all the circumstances just detailed, and although the water found in our well be the effect of filtration, and not of springs, of which there are none in this neighbourhood, I fancy the only effect of cutting off the Nile and Mahmoudieh Canal water, by flooding Lakes Aboukir and Mareotis by water from the sea, as in 1801, would merely be to stop the arrival of provisions from the interior of the country, which could then only reach us by the northern bank of the Lake Mareotis from the westward."

The above are the most important canals in the delta. The *Statistique de l'Egypte* gives the following list of navigable canals by provinces:—

Moudirieh of Kalionbieh, 7 canals, with a total length of 32,185 kassabas.* The principal of these are the Cherkaonieh and the canal of Ismailia.

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* A kassaba is about 11½ feet.

Moudirieh of Charkieh, 18 canals, with a total length of 176,952 kassabas. The most important is the Bahr Moez.

Moudirieh of Menofieh, 17 canals, with a total length of 101,803 kassabas. Among these the Chebini is the most important.

Moudirieh of Dakhalieh, 2 canals, of a total length of 39,184 kassabas, the most important being the Bhar-es-Sagir.

Moudirieh of Behereh, 2 canals, the Khatatbeh and the Mahmoudieh, their total length being 38,000 kassabas.

There are altogether 52 navigable canals in Lower Egypt, their total length being 496,796 kassabas.

XV.—CANALS IN UPPER EGYPT.

The canals of Upper Egypt consist in reality of one principal one running from Sohag, parallel to the Nile, and at a short distance from its left bank.

1. *The Sohagieh Canal.*

The canal of Sohagieh is a large natural stream of water which flows along the edge of the desert in a direction parallel to the Nile in the low part of the cultivated country, where it winds about and divides itself into several branches. This canal commences at Sohag, on the left bank of the Nile, and flows to Siout, where it joins the Ibrahimieh Canal; its length is, according to the *Statistique de l'Egypte,* 18,700 kassabas (41 miles), and its average width 165 yards. It does not contain water all the year round, except in some places, where it filters in from the river. It is the only canal in Upper Egypt that is opened formally towards the middle of August. To regulate the inundations of the Sohagieh, a submerged barrage has been formed at its mouth.

2. *Ibrahimieh Canal.*

The Ibrahimieh Canal is a continuation of the Sohagieh, joining this latter to the Bahr Jousef. By many writers this canal is included under the name Sohagieh. Its whole length is 107 miles, for the first 38 of which it has a breadth of 76 yards, and 52 for the remainder.

3. *Bahr Jousef.*

The Bahr Jousef is a perfectly natural water-course, leaving the Nile near Cossieh on the left bank, and continuing on in the same direction as the other two. A little north of Benisouef it divides; one branch, turning to the west, goes to Medinet, and separating into numerous

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smaller canals, waters the rich district of Fyoom, while the other goes on northwards, and eventually terminates in the sand, not far from the Rosetta branch of the Nile, a little below the barrage, passing at some distance to the west of Cairo.

The two most important artificial constructions on the Bahr Jousef are the bridge barrage of Ellaoun and the dyke of Cocheiche. The first is situated on the western branch, a short way below the bifurcation. It was made at the entrance to the Fayaun, in order, by closing it, to prevent too great a quantity of water from passing and thereby damaging that district. The old barrage, which was destroyed by the action of the water, was of very ancient date; but a new one has been erected, and the old one taken away. The second is a large dyke some miles lower down on the direct branch; it serves to retain all the water running from the inundation basins of Upper Egypt, and send it as required, either on to the lower land or back into the Nile. By this dyke, which is very old, they also regulate the depth of the water higher up.

4. *Strategical value of the Canals in Upper Egypt.*

With reference to the use of these canals during operations in Upper Egypt, the following remarks by the Rev. Mr. Badger and Sir James Outram appear pertinent. At page 55, Supplement to Report on Egypt, &c., 1862, Mr. Badger says: "I note here that Sir James Outram's opinion respecting the impracticability of the Bahr Jousef as a mode of transit for a British army moving on Cairo from Keneh is confirmed by what I learnt regarding that canal during our late trip. It is only navigable for small boats during the inundation; and the Sohagieh, another large canal which runs into the Bahr Jousef from the south, is nearly dry, except at high Nile. I mention this because Sir James had not time during his former visit to make special inquiries on the subject. But, even if both canals were navigable, they would be of little use to our army, supposing the enemy to have adequate forces at his disposal, and steam transport to convey them to any point on the west bank of the river. Moreover, the mouth of the Sohagieh is 86 miles below Keneh, and joins the Bahr Jousef 110 miles farther north. Hence, even if the latter were available for transport, our army would still have to march 200 miles from Keneh, or half the distance to Cairo, before reaching it."

Sir James Outram expresses himself thus in Reports and Minutes on French Designs in the Red Sea, &c., 1862, p. 86 :—"The obstacles which are likely to be interposed by the enemy to the descent of the Nile to Toura (a short distance above Cairo) were considered in the last section. They may prove of so formidable a nature that, should sufficient land carriage be procurable, the Commander-in-Chief might think it preferable to avoid the Nile altogether, by marching down the western bank of the Bahr Jousef, by which the numerous cuts which intersect the land to the eastward of the canal would be avoided, and the positions which the enemy had prepared between the canal and the river would be turned; but not only is it highly improbable that the army would be rendered independent of water transport by a sufficient supply of land carriage, but it is scarcely possible it could have the means of moving by land the heavy ordnance and siege material with which it would be encumbered. I have already expressed a fear that the Bahr Jousef would not offer any facilities for the transport of an army; and my principal reason for entertaining this fear is, that the canal in question is only navigable at high Nile, and then only for boats of a very small burden. Should the descent be attempted when the Nile is low, the canal would be of no use; should it be undertaken when the Nile is high, difficulties all but insurmountable would, I apprehend, be created by the spread of the inundation to the base of the mountains which bound the Nile to the westward. I doubt, moreover, whether boats sufficiently small for the canal would suffice for the transport of our heavy guns and siege material, and further doubt whether, if the boats should be found to be of adequate dimensions, a sufficient number could be procured."

In treating this subject, it must, however, not be overlooked that the Bahr Jousef was used by both Murad Bey and Desaix in the campaign of 1798, and that both had flotillas on it in the beginning of September. The following extract from Napoleon's Memoirs, published by Bertrand, Paris, 1847, vol. i, p. 285, exemplifies this point, and also the strategic value of this canal:—

"Desaix arrived at Abou Girgieh on the 4th of September, and Murad Bey, having divined the project of his enemy, sent his flotilla back up the canal of Jousef, along which he extended his right, so as to communicate with Siout, having the little Oasis directly in his rear. At 5 o'clock in the evening, Desaix, at Abou Girgeh, heard of this movement of the flotilla. He started with one battalion of the 21st Light Infantry at six o'clock in the morning, marched to his right, and accomplished eight leagues. He arrived at Bahnaceh, intersecting the canal of Jousef; but he arrived too late. The boats of the enemy had

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passed, with the exception of twelve with baggage, which he captured after some slight firing. One of these barges carried seven pieces of artillery."

Murad Bey's flotilla ascended the Nile followed by Desaix. Not being able to do anything, "he (Desaix) retired upon Darout-el-Cherif, entered the canal of Jousef and descended to the Fayaun. The hostile flotilla descended (the river) by Darout-el-Cherif to Abou Girgeh, and to Benisouf opposite, the country resounded with cries of victory."

The French, because they retreated, were beaten. Nevertheless, the French army experienced the greatest difficulties. Their boats went aground at every step. They surmounted everything. On the 3rd of October they arrived at Labuan, at the entrance of the Fayaun, and made use of the stone bridge (mentioned above) which crosses the canal, and which allowed them to manœuvre on both banks. In reading this, it should be remembered that about this time of year the Nile is generally at its highest.

The above are the most important canals in Upper Egypt.

The *Statistique de l'Egypte* gives the following list of navigable canals by provinces :—

Moudirieh of Esneh—
    2 canals.
Moudirieh of Keneh—
    8 canals, with a total length of 36,010 kassabas.
Moudirieh of Girgeh—
    40 canals, with a total length of 137,618 kassabas. The most remarkable is the Sohagieh.
Moudirieh of Siout—
    7 canals, with a total length of 58,332 kassabas. Of these, the most important are the Ibrahimieh and the Bahr Jousef.
Moudirieh of Minieh—
    This province contains the continuations of the Ibrahimieh and the Bahr Jousef, their combined length being 69,010 kassabas.
Moudirieh of Benisouf—
    5 canals, including part of the above-mentioned Bahr Jousef. Total length 44,078 kassabas.
Moudirieh of the Fayaun—
    The only navigable canal in this province is one branch of the Bahr Jousef. Its length is 6,708 kassabas.
Moudirieh of Girgeh—
    This province contains no navigable canals.

In Upper Egypt there are altogether 61 navigable canals, with a total length of 375,756 kassabas.

XVI.—RAILWAYS.

Railways.

At present there are 901* miles of railway open in Egypt. This may be divided into two portions :—

(1.) Lower Egypt (north of Cairo), 634¾ miles, partly double and partly single.

(2.) Upper Egypt, south of Cairo, 266¼ miles, single all the way.

The whole of the Delta is now covered with a network of railways. There is also a line to Suez, and one running south along the left bank of the Nile into Upper Egypt. This latter has lately been put into direct communication with Alexandria. Thus the extreme points of Alexandria, Damietta, Suez, and El Rhoda are all connected by rail. Besides the main lines, there are several branches, and two or three more are in process of construction or waiting to be opened. Throughout all the Egyptian lines the rails are laid on cast-iron pot sleepers, these sleepers being connected by transverse round iron bars.

Rolling Stock, &c.

In 1873 there were 239 locomotives and 5,258 carriages and trucks in Egypt; 20,544 tons of coke are consumed annually.

Water-supply.

The supply of water to all the railways at present open in Egypt is abundant.

LOWER EGYPT.

I.—ALEXANDRIA—CAIRO.

Alexandria—Cairo, 131 miles. (Double, except at bridges over Nile.)

This line was the first constructed in Egypt. It passes the whole way over the flat ground of the Delta, and as Cairo is only 60 feet above the sea, it is practically level. The line keeps to the south of the canal, crossing the shallow sandy Lake Mariout, and, after passing the large village of Damanhour, crosses the Rosetta branch of the Nile at Kafr Zayat by a bridge. From Kafr Zayat the line passes on the south side of the village of Tantah, and crosses the large canal Birket-es-Saba and the Damietta branch of the Nile at Benha by bridges. From Benha it turns more south, passing close to the east side of Kalioub village, and thence curves gradually into the suburb of Boulak (Cairo).

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* From information supplied in 1877.

Bridges.

The railway crosses a great number of smaller channels of the river, the bridges over which are of wood or stone. The only moveable ones are the three at the points mentioned above. At Kafr Zayat the bridge is at the salient point of a sharp bend to the eastward. It is 1,600 feet between the stone abutments, and is a wrought iron tubular girder (for one line of rails only) on iron cylinders 10 feet diameter, in 14 spans of nearly 120 feet each; these are sunk on an average 70 feet below the bed of the river into coarse clean sand. The under side of the girder is some feet above high Nile of 1853, which is one of the highest. The line crosses the Birket-es-Saba by a tubular bridge. At Benha there is a tubular bridge with iron cylinders somewhat similar to the one at Kafr Zayat (for one line of rails only), in 10 spans of about 90 feet each, but the rails run along the top of the girder in the Benha bridge, and between the sides of the girder in the Kafr Zayat. Each bridge opens in the centre to allow boats to pass. The two centre bays turn horizontally on the centre pier; the machinery is in the centre pier, and there is so little friction in it that six men can move the double girder, altogether 150 feet long. The bridge over the Birket-es-Saba turns in a similar manner.

Embankments.

The line throughout is from 10 to 15 feet above the flat country, the soil excavated from the sides forming a broad ditch on each side the whole way. This is filled during high Nile, and outside again is a path for the ordinary traffic of the country. As there are no hedges and but few trees, the line of railway commands a good view.

Stations.

The following table shows the stations and their distances from each other and from Alexandria:—

	Miles.	Chains.	Miles.	Chains.
Alexandria	...	...	...	...
Kafr-Dawar	17	26	17	26
Abon-Hummus	17	24	28	50
Damanhoor	10	3	38	53
Tel-el-Barood (junction)	16	7	54	60
Kafr-Zayat	10	60	65	40
Tantah (junction)	11	0	76	40
Birket-el-Sab	11	30	87	70
Benha (junctionl)	13	70	101	60
Tooh	7	60	109	40
Kalioub (junction)	11	60	121	20
Cairo	9	60	131	0

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The station at Alexandria is about 100 yards west of the terminus of the Mahmoudieh Canal, which is outside the gate of that name, and therefore not far from the harbour, nor much above it. At Tantah the station is, according to Murray, handsome and well built.

The terminus at Cairo is on the north side of thecity beyond the canal.

Junctions.

(*a.*) Tel-el-Barood : junction for—
    Embabeh and Upper Egypt (new route).

(*b.*) Tantah : junction for—
    (1.) Mohallet Roh ... Dessouk.
        Kafr Shek.
        Damietta.
        Zifte.
    (2.) Shibin-el-com.

(*c.*) Benha : junction for—
    (1.) Zagazig ... ... Mansourah.
        Salahieh.
        Ismailia—Suez.
    (2.) M itber

(*d.*) Kalioub : junction for—
    (1.) Belbéis Zagazig ... Mansourah.
        Salahieh.
        Ismailia—Suez.
    (2.) Saidieh (barrage).

Lines constructed but not opened.

Although Damanhour is not at present a junction, two lines running from it are ready to be opened, *viz.* :—

(1.) To Atfeh and Rosetta, total distance 34 miles.

(2.) To a point on the Nile opposite Dessouk ; it will go on to Shirbeen, cutting off a considerable length in the journey from Alexandria to Damietta. The works for this latter part of the line have not yet been completed. The distance from Damanhour to Dessouk is 12 miles, and from Dessouk to Shirbeen 58 miles.

II.—Tel-el-Barood—Embabeh.

Tel-el-Barood—Embabeh, 73½ *miles.* (*Left bank of the Nile. Single line.*)

This is a line lately opened, running to the west of the Rosetta branch, and joining the line to Upper Egypt at Embabeh, opposite Cairo. It shortens the distance from Alexandria to the capital, and puts the former place in direct communication with Upper Egypt.

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The following table shows the stations, with their distances from one another and from Tel-el-Barood :—

	Miles.	Chains.	Miles.	Chains.
Tel-el-Barood	...	...	...	...
Com-Amadeh	8	40	8	40
Terriah	10	0	18	40
Kafr Daoud	11	0	29	40
Wardan	14	40	44	0
Menache	17	0	61	0
Boulac Dacrour (for Embabeh).	12	40	73	40

III.—TANTAH—DAMIETTA.

Tantah—Damietta, 71½ miles. (Single line.)

This line runs to the west of the Damietta branch, and is at present the shortest way by rail from Alexandria to Damietta. From Samanhoud to Shirbin the line runs not far from the river. The stations of Samanhoud, Talka, Shirbin, and Damietta lie on the banks of the river. Talka is opposite Mansourah, from which place a line of rail (VIII) runs to Zagazig. The country through which this line passes is flat, but no details of the construction, &c., of the line have been ascertained.

The following are the stations, with their distances apart, and total distance from Tantah :—

	Miles.	Chains.	Miles.	Chains.
Tantah	...	...	...	...
Mohallet Roh (junction)	10	0	10	0
Mohallet Kibir	6	40	16	40
Samanhoud	4	40	21	0
Talka (opposite Mansourah)	12	0	33	0
Shirbin	12	0	45	0
Kafr Terrah	7	40	52	40
Damietta	19	0	71	40

Junctions.

(*a.*) Mohallet Roh : junction for—

Dessouk 36½ miles and Zifte 23½ miles.

IV.—MOHALLET ROH—DESSOUK (1).

Mohallet Roh—Dessouk, 36 miles. (Single line.)

The following are the stations, with their distances apart, and total distance from Mohallet Roh :—

	Miles.	Chains.	Miles.	Chains.
Mohallet Roh	...	...	...	...
Koutour	11	26	11	26
Nashart (old station junction)	10	16	22	2
Shabaas	7	5	29	7
Dessouk	6	70	35	77

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From Nashart to Kafr Shek, the stations are—

Nashart new station, Mohallet Moussa, Sakka, and Kafr Shek, total length of the branch 10 to 15 miles.

V.—Mohallet Roh—Zifte (2).

Mohallet Roh—Zifte, 23½ *miles.* (*Single line.*)

The following are the stations, with their distances apart, and total distance from Mohallet Roh :—

	Miles.	Chains.	Miles.	Chains.
Mohallet Roh	...	...	...	...
Kourrachie	3	18	3	18
Santa	11	66	15	4
Zifte	8	48	23	52

VI.—Tantah—Shibin-el-Com.

Tanta—Shibin-el-Com, 18¾ *miles.* (*Single line.*)

[This is a short line running south from Tantah to Shibin-el Com, a town on the Chebine Canal.]

The following are the stations, with their distances apart, and total distance from Tantah :—

	Miles.	Chains.	Miles.	Chains.
Tantah	...	...	...	...
Tallah	8	0	8	0
Shibin-el-Com	10	60	18	60

VII.—Benha—Suez.

Benha—Suez, 124 miles. (*Double line as far as Ismailia.*)

The overland mails are taken by this route direct from Alexandria to Suez, without going to Cairo. The direction of this line as far as Nefiche is easterly; it then turns to the south and runs on to Suez. From Nefiche a short branch goes to Ismailia, on the Maritime Canal. Between Benha and Zagazig it twice crosses the Bahr Moez, and from Zagazig runs to Nefiche, parallel to and near the northern bank of the Sweet-water Canal, passing through the rich El Wâdy estate of the Suez Canal Company. From Abu Ahmed, an intermediate station, for a considerable way the railway may be said to form the line of division between the cultivated land and the desert. To the north are nothing but sandy hillocks, stretching away to the horizon, while on the south, a short distance from, if not close to, the line, is luxuriant vegetation, produced and nurtured by the canal. After leaving Nefiche the line crosses the Sweet-water Canal, and the rest of the way to Suez runs

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parallel to, and to the west of, both it and the Maritime Canal. The country is all desert, a few signs of vegetation occurring now and then in the neighbourhood of the Fresh-water Canal. At Chalouf the railway approaches to within a short distance of the Suez Canal, the high banks of which can be seen within a few hundred yards from the carriage windows. Continuing along the high desert land, out of reach of the tides which still sweep up for some distance above Suez, the line makes a detour to the west, and turns into the valley to join the track of the old line between Cairo and Suez. The line is continued down, past the Suez station, to the new docks and landing quays, close to the roadstead, about 1½ miles further on. The country through which this line passes is flat, except the hills mentioned above, but no information concerning the construction has been obtained.

The following are the stations, with their distances apart, and total distance from Benha:—

	Miles.	Chains.	Miles.	Chains.
Benha	...	...	...	...
Miniet El Gam	12	0	12	0
Zagazig (junction)	12	0	24	0
Abou Ahmed	10	40	34	40
Tel-el-Kibir	6	59	41	19
Mahsameh	13	70	55	9
Nefiche (branch 2½ miles to Ismailia)	13	70	68	79
Sérapéum (village 2 miles from station)	8	22	77	21
Faid (near shore of Great Bitter Lake)	10	10	87	31
Geneffe	12	26	99	57
Shalouf	11	20	110	77
Suez (Station)	11	42	122	39
Suez (Harbour)	1	40	124	0

Junction.

Zagazig Junction :—

(1.) For Mansourah and Salahieh.

(2.) For Belbéis—Kalioub (for description see Kalioub further on).

VIII.—ZAGAZIG—MANSOURAH.

Zagazig—Mansourah, 43¾ *miles.* (*Single line.*)

This line is on the most direct route from Cairo to Damietta, but at Mansourah the river has to be crossed in a boat when you can join the Tantah-Damietta line, and so proceed. At El Booka it crosses the Moez Canal, 3 miles north of Abou Kibir.

The following are the stations, with their distances apart, and total distance from El Wasta :—

	Miles.	Chains.	Miles.	Chains.
El Wasta	...	...	...	...
El Edona	20	13	20	13
Fyoom	4	67	25	0
Ebchouaye	6	43	31	43
Abousca	8	0	39	43

XV.—MEGAGEH—ABA-EL-QUAKE.

8 miles.

XVI.—BENI MAZAR—ABA-EL-QUAKE.

9 miles. (*Single line.*)

These short branches join at Aba-el-Quake, but are only used for a few days in the year during a fair.

XVII.—SOUDAN RAILWAY.

552½ *miles.* (*Projected line.*)

The projected Soudan line will be 552½ miles in length, from Wady Halfa (second cataract) to Metemmeh, a station on the left bank of the Nile opposite Shendy, latitude 16° 40′ N., and longitude 32° 25′ E. This line will be completed on the north by a junction with Assouam in Upper Egypt, and on the south-east by a junction with the Red Sea, probably by Kassala and Massowah. The first portion from Wady Halfa to Koheh, 159½ miles in length, on the right bank of the Nile, has six stations :—

	Miles.
Wady Halfa	...
Sarrus	32¼
Ambigole	63¼
Akasha	91¼
Ammarey	126
Koheh (right bank)	159½

The second portion comprises the crossing of the Nile at Koheh. The third portion from Koheh to Ambukal, a distance of 216¾ miles, has ten stations :—

	Miles.
Koheh (left bank)	160¼
Kakir Bender	192½
Hannek*	218½
Ordeh (or New Dongola)	246
Teti	268½
Handak	287
Old Dongola	315½
Dabbe	336½
Abdonhin	353½
Ambukal	376½

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* Mr. Cave states in his report that the line will not go beyond Hannek, the remainder having been given up.

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The fourth portion, from Ambukal to Shendy, a distance of 175¾ miles, crosses the desert of Bahinda, and finishes at the terminus of Metemmeh, 552½ miles. There are five stopping places for water :—

Mofokkakarb,
El Howeigat,
Abou Halfa,
Djebel en Noos, and
Abou-Kly.

Local lines at Alexandria.

XVIII.—ALEXANDRIA—ROSETTA.

43½ miles.

This line has stations at Ramleh, Aboukir, Maadieh, Edkoo, and Rosetta.

XIX.—ALEXANDRIA—MARIOUT.

About 23 miles.

"This line runs from Alexandria westward along the sandy strip between Lake Mareotis and the sea. At Mariout there is a palace of the Viceroy. During the latter portion of the line it runs through a corner of Lake Mareotis, which is shallow. There is a branch line from it going off along the shore to the quarries at El Max."

NOTES ON EGYPTIAN RAILWAYS.

H. P. LeMessurier—1877.

"Time tables do not exist. Drivers cannot read and have no watches. The track is good everywhere; engines and stock are worn out. The line from Cairo to Alexandria is double; most of the rest is single, with plenty of siding room. Engines can haul a very full load, as curves are flat and gradients nominal. Distances are not great, and fair speed can be maintained. Horses, asses, oxen, buffaloes, sheep, goats, are all put together into six-wheeled trucks without partitions. There are no horse-boxes. Egyptian troops put their kit into the trucks, and sit on the bundles anyhow.

"It seldom rains, and except on a few of the worst days in May and June, Europeans used to India would laugh at the heat. Solah hats are nevertheless almost essential. There is so little rain that pith suffices."

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XVII.—TELEGRAPHS.

Egypt is now covered with a complete network of telegraphs, and is also connected by submarine wires with all the principal parts of the globe.

The following tables and description are taken from the *Statistique de l'Egypte* for 1873 :—

Telegraphs—State Lines.	No. of wires.	LENGTH IN KILOMETERS.	
		Of the lines.	Of the wires.
Lower Egypt.			
Cairo—Alexandria	6	223·6	1,341·9
Lines round Cairo	2	80·4	160·9
Cairo—Kalioub—Barrage	2	28·9	57·9
Cairo—Gaza (*viâ* Benha)	2	455·3	910·6
Cairo—Suez (*viâ* Benha)	1	242·9	242·9
Cairo—Mansourah (*viâ* Kalioub)	2	154·4	308·9
Cairo—Suez (old direct line)	4	144·8	579·2
Benha—Mitbereh (palace)	2	14·4	28·9
Benha—Zagazig—Suez	2	197·9	395·8
Tantah—Talkah—Damietta	2	115·8	231·6
Tantah—Zifte	2	53·0	106·0
Tantah—Dessouk	2	74·0	148·0
Tantah—Chebini el Com	2	30·5	61·1
Ismailia—Port Said	1	74·0	74·0
Kantara—Port Said	1	41·8	41·8
Damanhour—Atfeh Rosetta	2	90·1	180·2
Upper Egypt.			
Cairo—Minieh	2	276·7	553·4
Minieh—Siout	2	144·8	289·6
Siout—Keneh	2	255·2	450·5
Keneh—Assouam	2	257·4	514·8
Assouam—Ouady Halfa	2	337·8	675·7
Soudan.			
Ouady Halfa—Koibeit Selim	2	233·3	466·6
Koibeit Selim—Ourdyeh	2	96·5	193·0
Ourdyeh—Abon Doum	2	185·0	370·0
Abon Doum—Berber	2	394·2	788·4
Berber—Shendy	2	168·9	337·8
Shendy—Khartoun	2	179·9	359·9
Derber—Kassala	2	370·0	740·1
Kassala—Suakin	2	482·7	965·4
Keneh—Cosseir	2	188·2	376·5
TOTAL ...	63	5,582·4	11,951·4
Projected Lines.			
Cairo—Siout	1	405·4	405·4
Kassala—Massaouah	2	353·9	707·9
Massaouah—Suakin	2	280·0	560·0
TOTAL ...	68	6,611·7	13,624·7

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Telegraphs—State Lines.	No. of Wires.	Length in Kilometers.	
		Of the lines.	Of the wires.
Brought forward ...	68	6,611·7	13,624·7
Lines for particular Services. Anglo-Mediterranean Telegraph Company.			
Alexandria—Suez, *viâ* Cairo (old line) ...	2	368·4	736·4
Alexandria—Suez, *viâ* Benha and Zagazig (new line)	2	362·0	724·0
Suez Canal.			
Port Said—Suez, *viâ* Ismailia	2	165·0	330·0
Ramleh Railway.			
Alexandria—Ramleh	1	8·0	8·0
TOTAL ...	7	903·4	1,798·9
GRAND TOTAL ...	75	7,515·1	15,423·6

For the 5,582 kilometres of telegraphic lines actually worked by the State, there are 77 stations. The service is carried on in the Arabian language, and also in Lower Egypt in French, Italian, and English. There are 368 special clerks, and 200 who are employed in the combined service of the railways and telegraphs. Egypt is connected with foreign countries as follows:—

1. With Syria and Constantinople, by the land telegraph to Gaza.
2. With Europe, by the submarine line from Alexandria to Malta and Sicily.
3. With Australia and the East, by the submarine line from Suez to Aden and India.

Further, two other submarine lines are projected, one from Alexandria to Bône (junction between Algiers and Marseilles); the other from Alexandria to Brindisi, by the Greek Islands.

XVIII.—NATIVE TRANSPORT.

The land carriage of Egypt consists of camels, horses, and donkeys.* It is impossible to form any closely approximate estimate of the number of these, but they must be very considerable. A vigilant government would of course contrive to have them withdrawn for a time from the reach of an enemy operating from the Mediterranean coast; but an army in possession of Lake Menzaleh could open dealings with the Arab tribes occupying the deserts bordering on Syria, who, if their communications with the force were fairly secured, would not be deterred by any dread of the Egyptian Government from hiring or selling their camels. From this quarter, General Outram was assured from 2,700 to 3,300 camels could be procured for hire, and others for purchase; and from the same source supplies of sheep and goats might be obtained. At Cosseir an army might procure 1,000 camels for hire, and abundance for purchase; while at Keneh, on the Nile, probably 200 horses could be obtained within a week. A force landed at Suez might equally depend on being supplied by the tribes near that place, and those in the neighbourhood of Sennaar with about 3,300 camels for hire on reasonable terms; and probably a few horses could be purchased from the same source. At all events, sheep and goats might be had in any numbers.

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* Captain Collinson remarks in despatch $\frac{418}{32}$ that there are no wheeled carriages out of the great towns.

Colonel LeMessurier (1851) says :—" Horses can be supplied from the Nile valley, but not in any great numbers or of a superior breed. A large number of donkeys would be readily found everywhere; and a more useful animal than the Egyptian donkey, as a beast of burden, cannot be found ; its powers are astonishing. Of mules the supply is but small in Egypt; those in use for the artillery are brought from Syria, Cyprus, &c. They are common, however, on the Berbereh coast, and might be obtained by arrangements at Aden."

List of Arab Tribes, with numbers they could supply to an Army stationed at various places.

Station of Army.	Names of Arab Tribes.	Camels.	Horses.	Remarks.
Damietta ..	Bille Welad Ali and Hanaide	1,500 to 2,000		
Salahieh, Katieh, &c.	El-Anshee, Fowackreeah, or Khan Ennie.	1,200	...	The camels are of an excellent kind, well adapted to heavy stores. (Sheep or goats in any number).
Suez* ...	Arabs of Mount Sinai Peninsula. These are Allegut Sowalheh and Mez Ameh, commonly known as the Soora Arabs.	350 to 400		

* Sheep and goats in any numbers are to be obtained here.

Station of Army.	Names of Arab Tribes.	Camels.	Horses.	Remarks.
Suez*—contd.	Tribes in the neighbourhood of Cairo and the Sheikeeah, *viz.*, El Aidee, Gehanah, Tuhekah, Howelak, Tonabeen, Alih At, Hultamee, &c.	2,000		
	Shoomayree ...	600	...	These are the best and strongest camels; they carry as much as 700 pounds.
	Ditto obtained from Fellahs ..	300	...	
	Horses could not be bought from these tribes in any numbers, but from Fellahs.	...	Any number.	
Cosseir* ...	Mazree and Ababdi ...	1,000		
	Horses could be procured from Kenneh and neighbourhood in about a week.	...	200	

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* Sheep and goats in any numbers are to be obtained at both places.

* *Farm Animals in each Province of Egypt—Beasts of Burden, Sheep, &c.*

Provinces.	Oxen, cows and calves.	Buffaloes.	Horses and mares.	Mules.	Donkeys.	Camels.	Sheep.	Goats.
Damietta	12	3	637	...	377	25	193	47
Beherah	4,729	14,539	1,302	119	5,669	1,892	5,191	...
Garbieh	37,325	41,654	5,859	685	19,841	6,013	34,241	2,167
Charkieh	13,881	7,509	1,321	482	5,868	2,210	5,546	1,171
Dalkalieh†	13,519	18,489	2,893	510	10,685	3,138	12,175	...
Menonfieh	21,691	56,279	1,430	185	22,810	10,503	26,004	4,303
Basin of the Mahmoudieh	9	25	25	...	37	...	17	...
Galionbieh	10,431	11,616	818	...	8,684	3,719	15,574	...
Denisonef	2,080	1,795	419	10	1,923	590	4,224	2,223
Fayaum	10,000	4,000	2,000	100	2,000	1,000	10,000	5,000
Minieh-Benimazar	2,766	1,550	400	8	2,580	1,019	11,469	3,679
Siout	2,908	1,477	365	...	4,120	1,969	22,913	...
Oasis of Siout	153	348	37	...	809	...	102	394
Ghergheh	3,080	3,656	479	3	3,929	1,521	9,174	...
Keneh	2,162	1,664	167	...	3,262	1,539	9,179	2,507
Esneh	2,243	508	51	3	2,047	440	6,665	2,416
TOTAL ...	126,989	165,111	18,203	2,105	94,641	35,578	172,657	23,907

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* From the *Statistique de l' Egypte*, 1873, p. 273. The table does not include the capital or the ports.

† Exclusive of the animals on the Daira Estate.

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XIX.—REMARKS BY GENERAL MACDOUGALL, 1876.

The different railway junctions are very favourable to such a strategical disposition of the defensive force as would enable it to be massed very expeditiously on any point threatened.

The march of an army through the cultivated country would be impracticable if seriously opposed, because it is irrigated by countless canals and ditches of varying size, some of them navigable, which derive their water from the Rosetta or Damietta branches of the Nile.

The canals and some of the larger ditches have water in them throughout the year; the remainder are dry at time of low Nile; but all could in a few hours be converted into entrenchments by the labour of the country people, who are nearly all employed during several months in each year in cleaning out the irrigation canals and ditches, and would, therefore, find themselves quite at home in the use of entrenching tools.

And while the general face of the country is thus intricate, there are no roads worthy of being called such. At the time of high Nile the only means of traversing the cultivated country is by means of earthen causeways, from 10 to 15 feet wide, which skirt the branches of the Nile and the canals, good only for horse, mule, or camel traffic, but impassable for wheels, owing to the number of transverse cuttings made to let the water through.

There are also narrow pathways for animals along the principal dykes.

At the time of low Nile, indeed, cavalry and infantry could move over the surface of the country if unopposed; but artillery could only do so with great difficulty.

If unopposed, also, troops could conveniently march along the railways, which run for the most part from 10 to 15 feet above the general level of the country, on embankments formed by excavating the soil on either side so as to give two ditches, which are filled at time of high Nile. But the railways would facilitate the defence rather than the attack; their use by an enemy could easily be forbidden by breaking some of the very numerous small bridges over the irrigation canals, and any timber for their re-construction would have to be brought to the country from abroad. Besides which, the railway embankments can in places be utilised as lines of defence.

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Roads in the Delta.

General remarks.—High Nile.

The following is obtained principally from Captain Collinson:—In the Delta a pathway passable for animals will be always found along the principal dykes at all times of flood. These dykes run across the line of direction of the river. The other pathways used in times of high Nile are along the banks of the canals and river, crossing at the bridges.* They are all about 10 to 15 feet wide at top, made simply of the natural soil, which, when dry, becomes firm enough for horse traffic. There are no wheel carriages out of the great towns, and although the pathways are wide enough, it would be a very tedious operation to get carriages along them owing to the innumerable cuts for drawing the water from the canals to the lands.

Low Nile.

When the water has been finally drawn off the land for the year, there are pathways more direct from village to village, raised a little above the surface, otherwise the same as all other pathways, without any obstruction but the same innumerable cuts for water. Then infantry and cavalry could cross the country in any direction; it would be difficult though not impossible for field artillery, from the soft soil and the numerous ditches; they would have to be provided with planks to get the wheels over such obstacles. The small pontoon bridge would be very useful to cross the canals (whether wet or dry) without going round by the bridges.

XX.—FORTIFICATIONS.

I.—The Defences of Alexandria.

The existing fortifications at Alexandria were planned at Paris, under Marshal Soult, when Minister of War, and have been carried out in a great measure under the superintendence of French engineers. All modern improvements have been taken advantage of; the whole of the works are of stone and well built, and supposing them to be completely armed and manned, present an extremely formidable line of defence.

They may be classed under three heads:—

(*a*) The outlying works to the westward destined to oppose an advance from the direction of Marabout, and commanding the western harbour.

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* Of these there are in Lower Egypt 276, including railway bridges, according to the *Statistique de l'Egypte.*

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(*b*) The works on the north, commanding the sea approaches and the eastern harbour.

(*c*) The enceinte and included works, more especially bearing on the approaches from Aboukir, with the detached forts on the south front, bearing on lake Mareotis.

The following details are taken generally from Colonel LeMessurier's notes and plans, based on information secretly obtained some 25 years back, and are believed to be of complete accuracy. Many were at that time unfinished, and the greater part of them unarmed; at the present moment it is probable that the guns are not in position, but the arsenals are well stocked, and the whole armament might be rapidly mounted. In 1861, Mr. Badger reported many of the works to be out of repair and falling to pieces, besides being ungarrisoned and destitute of armament, but the attention directed to the defences in recent years by the Egyptian Government has, it is believed, led to their being restored, and unofficial travellers have reported them to be in all respects in an efficient condition.

As regards an attack on Egypt, it is unquestionable that nothing would be gained by opening a siege of this system of works, since they may be turned by passing to the south of Lake Mareotis, or into the Delta by Aboukir and Damietta, *i. e.*, either from the west or the east.

The eastern harbour, it is scarcely necessary to observe, has long been disused, owing to its exposure to the north winds, and the rocks and shoals with which it is encumbered.

The Boghaz, or central channel into the western harbour, has 5 to 6 fathoms of water; the Marabout channel $4\frac{1}{2}$ to 6; the Corvette channel somewhat less: these are the only ones utilised for shipping of any size; all others are exceedingly dangerous, being very narrow and shallow. When the breakwater, which forms one of the principal features in the magnificent harbour now under construction by an English Company, is completed, Alexandria will have a port containing an area of 1,400 acres of deep water 5 fathoms and upwards, with landing quays nearly $2\frac{3}{4}$ miles in length. The breakwater commences about 800 yards south-west of the Ras-et-Teen light-house, and, running 500 yards south-west, makes a bend to the south-south-west for 2,050 yards, giving a total length of 2,550 yards. The principal entrance will be round the south-west end, about 1,500 yards from the shore, while there will be another entrance for small vessels and boats between the north-east end and the light-house at Ras-et-Teen. The top of the breakwater will be 10 feet above the

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lowest, or 7 feet above the highest, level of the sea; the width is to be 20 feet at top, with natural slopes to the bottom; the average depth of the water is 20 feet. The foundation-stone of this breakwater was laid in May 1871. It is further intended to run a great harbour mole from the shore at the landing-place of the Cairo Railway, in a northerly direction for a length of 1,100 yards, and with a width of 100 feet at top the area of 28 feet water enclosed by this mole will be 177 acres.

All further details of the harbour works at Alexandria will be noticed hereafter: the above is a brief sketch, which appeared necessary in connection with the defensive works.

A.—OUTLYING WORKS TO THE WESTWARD, DESTINED TO OPPOSE AN ADVANCE FROM THE DIRECTION OF MARABOUT, AND COMMANDING THE WESTERN HARBOUR.

1. *Fort Adjemee.*

(Plan A, General Map I of Colonel LeMessurier's Series—Marked 1 on General Map.)

Fort Adjemee, the most westerly of the detached forts, constituting the coast and harbour defences of Alexandria, stands on Marabout Island, about 7½ miles by the coast line from the city, and 6 miles in a direct line from Light-house Point (Ras-et-Teen), and 400 yards east from Marabout Point, or Cape Adjemee as it is also called. It commands the the Marabout or western entrance to the harbour. In the Admiralty chart this fort is called Marabout, and the name Adjemee is given to the adjacent work on the mainland.

It is a long, narrow, irregular work, the trace being adapted to the outline of the ground; the extreme length from east to west taken from scarp to scarp is about 280 yards; the depth between the curtains of the north front and the musketry wall, which closes the west half of the south front, about 45 yards. The roomiest part of the work is on the east side, where the south front is thrown forward from the flank of the cavalier, and the east bastion of the north front is extended in the form of an elevated platform north and east; here the depth is about 75 yards.

On the west bastion is a modern round tower, about 45 feet in diameter. The elevated platform connecting with the east bastion, and raised about 15 feet above the terreplein of the lower fort or curtain (itself about 24 feet above the water line), contains another tower, commonly called the Marabout tower, but only about half the size of that in the west bastion. The cavalier is placed behind the east end of the curtain of the north front.

The rampart extending round the west bastion, the whole of the north front, and round the elevated platform on the east end, has a solid masonry scarp, while the parapet of the south front is covered by a wall pierced for musketry fire.

With the exception of the guns in the curtains, which fire through embrasures, the whole of the armament is mounted *en barbette*.

A range of barracks runs parallel with, and immediately behind, the parapet of the west half of the south front, the powder magazine being placed at its west end.

Another small barrack adjoins the tower contained in the elevated platform. The magazine for artillery stores, &c., is situated at the gorge of the cavalier.

The entrance gate and landing place for boats is in the re-entering angle formed by the flank of the cavalier and the east half of the south front.

The armament of the work is given as follows:—

- Bearing north—
  - Lower forts: 10 Paixhans (54-prs.), 5 18-prs.
  - Elevated platform: 6 Paixhans (54-prs.).
- Bearing east—
  - Elevated platform: 2 Paixhans (54-prs.), 4 18-prs.
- Bearing south—
  - Cavalier: 2 Paixhans (54-prs.), 4 18-prs.
- Bearing south-west and west—
  - 1 Paixhan (54-pr.), 2 18-prs.; also 4 mortars.

Total armament: 40 pieces.

2. *New fort, probably now completed—marked in Admiralty Chart.*

A new fort for 25 guns was to be constructed on the mainland at Marabout point (Cape Adjemee) in order to cover and command the lower parts of the fort on Marabout Island. There is no direct information how far the works have been completed, but the most recent Admiralty chart shows a fort here somewhat similar in trace to that on the island, and names it Fort Adjemee.

It may be here mentioned that the supply of water for the use of the troops in all the forts to the westward of Alexandria is furnished from the Mahmoudieh canal, and conveyed in skins on horses, donkeys, camels, &c., and kept in cisterns; the supply would not, as a rule, exceed a week's consumption, and might readily be cut off.

3. *Fort Sallameyeh.*

(Marked 2 on the Map—Plan B, General Map 1.)

About 2 miles east of the forts at Marabout is the strong fort Sallameyeh, standing on elevated ground, about 80 feet above the sea level, between the coast line and the shore of Lake Mareotis. The village of Dukhaylee on the coast bears about 600 yards north-east, and the shore of Lake Mareotis runs from 250 to 300 yards to the south of it. The elevated position of this fort gives it a complete command on all sides: it is a sort of advanced work to the line of fortifications at El Meks, about 2 miles further east, and is intended, in conjunction with these, to obstruct all approach from the westward.

It is a very irregularly shaped work, surrounded by a ditch cut out of the solid rock, the mean depth being 24 feet and mean width about 48 feet. The bottom of the ditch is, however, very irregular, as is also the width.

The fort may be said to consist of two courts, the terreplein of the smaller, or more easterly, being 6 feet lower than the larger or main work, and is entered from the east side by a bridge and drawbridge through strong gates 12 feet high, and flanked by guns and musketry, firing through casemated embrasures and loopholes. Round this court are the barracks and chambers.

The second and larger court is surrounded by a thick earthen parapet, pierced with embrasures; it is somewhat rectangular in shape, the longer sides firing north and south. From the west side, and from the centre of the south side, which is broken outwards, two irregular bastions are thrown forward, to afford flank defence, having vaulted chambers and casemated embrasures and loopholes. In the centre of this court is a flagstaff tower about 33 feet high, adjoining which is the powder magazine. The crest of the parapet is about 7 feet above the terreplein; the entrance height of the casemated bastions and powder magazine is about 21 feet above the terreplein; the thickness of the walls is about 6 feet.

The north side of the parapet of this court is pierced for 6 guns, the west side for 2 guns, flanking the advanced bastion, the south side for 9 guns, 5 of which are west, the remainder east of the advanced bastion; on the east side it connects by steps with the smaller court. At the entrance gate are 2 guns. The larger court has also 2 mortars. The total armament is thus 19 guns and 2 mortars.

It must be pointed out that the Admiralty chart gives no trace of this fort: moreover, the village of Dukhaylee is marked "Marsa-el-Kanat,"

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and Dukhaylee is placed about 1½ miles more to the westward, within half a mile or so of Marabout Point.

North of the village of Dukhaylee is a battery, *à fleur d'eau*, for 7 guns, known as Fort Dukhaylee.

From this point a railway runs in a south-west direction to the quarries from which the stone for the breakwater now in progress is quarried, and connecting through the isthmus with the main Alexandria–Cairo line.

4. *Lines of El Meks.*

(Marked 4 on General Map.—Plan C, General Map 1.)

The lines of El Meks are thrown across the isthmus or narrow neck of land, about 1,400 yards wide, separating the sea from Lake Mareotis, and occupy a front of about 1,200 yards, leaving an opening of about 200 yards between the extreme half bastion and the lake. The village of El Meks stands in front of the right flank, and is about 3½ miles distant from Alexandria. They are built on the east bank of the bed of an old canal, which now constitutes the ditch passing along the entire front. At both flanks there is a double range of batteries, while on the highest ground a little in the rear of the right is the citadel, a strong fort commanding the whole extent of the works on both sides. This fort or citadel is built on the rock, about 70 feet above the level of the sea, which is about 5 feet higher than that of Lake Mareotis. From the peculiar nature of the ground, the works of the lines are made to bear, half on the lake and the other half on the sea and harbour.

The lines consist of four bastions connected by curtains, the curtain between the 1st (or right) bastion and the 2nd being about three times as long as that between the 2nd and 3rd, or 3rd and 4th. In rear of the centre of this long curtain stands the rocky eminence on which is placed the citadel. The curtain is slightly broken outwards, and forms a succession of faces and flanks in front of the salient of the citadel. Between the 2nd and 3rd bastions is a ravelin. The width of the main ditch is about 75 feet, depth about 21 feet; in the centre runs a cunette about 15 feet wide by 12 deep. Both escarp and counterscarp are revetted with masonry. The width of the ditch of the ravelin is about 45 feet. Between the ditch is a glacis sloping down to the sandy plain. An old Arab road traverses the centre of the curtain of bastions 2 and 3, and crosses by a bridge over the ditch into the ravelin, whence it is carried to the left by another bridge over the ditch of this outwork into the re-entering angle of the glacis, and so into the country.

The main road from Alexandria to Dukhaylee and Marabout passes round the flank of the right bastion, while immediately in rear of the right between this road and the sea, and connecting with the new lines by a postern, is the old fort of El Meks, which, as well as the citadel, or new fort, contains casemated lodgements for soldiers.

The old fort mounts 15 guns and 1 mortar, all bearing on the sea: the citadel, a very irregularly-shaped work entered from the north-east by a road crossing the ditch by a bridge, mounts 11 guns bearing on the sea front, and 11 guns on the lake front. Twenty-six guns may thus be brought to bear on the central passage of the harbour.

The lines appear to be intended only for musketry fire.

The sand-hills rising up from the plain between El Meks and Dukhaylee vary from 20 to 60 feet in height; they are steep and abrupt to the south, but slope down gradually to the sea on the north; the highest part of the range is from 450 to 500 yards from the coast line. Between Fort Adjemee and El Meks, the beach is low and sandy; about Dukhaylee it is rocky.

Between the extreme half bastion on the left and the lake runs the branch line of railway to Mariout, which is then carried by an embankment across the lake. This line branches off from the main Alexandria-Cairo line at the bend of the Mahmoudieh canal a few hundred yards above the Alexandria station, and traversing the isthmus to within a short distance of the El Meks lines, bifurcates, one branch going to the right and cutting through the lines by the left curtain angle of the right bastion, connecting with Dukhaylee, the other to the left leading to Mariout.

5. *Chain of detached Forts crossing the Isthmus about 1¼ miles east of the El Meks Lines.*

About 1¼ miles nearer to Alexandria, namely, east of the lines of El Meks, the neck of land separating Lake Mareotis from the sea is again traversed by a defensive line, but of detached, not connected forts. There are in all five works, of which three are placed close together on the coast line (on the right) at and about Cleopatra's Baths, one is on the left commanding the lake, and one in the centre about midway between the sea and lake.

(*a.*) *Fort El Jessowreh.*

(Marked 5 on General Map—Plan D, General Map 1.)

The central of these forts, El Jessowreh (called in the Admiralty chart El Usura) is a lunette, and stands on elevated ground command-

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ing the lake and the country towards the El Meks lines. Length of face about 150 yards, flank about 65 yards, taken along the scarp line; width of ditch about 50 feet, depth 20 feet; height of scarp 30 feet, counterscarp 20 feet; crest of parapet about 8 feet above scarp; thickness of parapet 30 feet; total thickness of rampart from scarp line to revetted slope of terreplein 70 feet; level of interior of work 10 feet below crest of scarp; thickness of walls of scarp about 13 feet. Below the rampart and terreplein are vaulted chambers to hold 300 men, loopholed, and commanding the ditch. The scarp is supported by buttresses at about every 25 yards. The gorge is closed by a line of casemated barracks, in the centre of which are double entrance gates, approached by a passage or covered way crossing the ditch by a drawbridge about 46 feet in length.

The powder-magazine is under the mass of the rampart of the north flank of the work. There are three ramps, one at the salient and one at each shoulder angle.

The armament is reported as follows:—

N. W. face	20 guns.
S. W. „	20 „
N. flank	5 „
S. „	5 „
TOTAL ...	50 guns with 2 mortars.

(*b.*) *Fort Kimareeyeh or Malcha.*

(Marked 6 on General Map.—Plan E, General Map 1.)

On the left of the line is Fort Kimareeyeh (in the Admiralty chart it is named Malcha). Some diversity of opinion exists, indeed, both in regard to the exact position as well as name of this work. Colonel LeMessurier places it about 150 yards south-east of Fort Jessowreh (called El Usura in the Admiralty chart), while Colonel Outram marks it on the borders of Lake Mareotis, *i. e.,* from 600 to 700 yards from that fort, and fills the place of Colonel LeMessurier's fort with a smaller work.

It must be observed, however, that the most recent Admiralty chart of the port of Alexandria places this fort in the position assigned to it by Colonel LeMessurier, namely, on the left rear and within 100 yards or so of Fort Jessowreh, both being marked north of the Mariout line of railway, which runs about 500 yards from Lake Mareotis. No fort is shown in this chart south of the railway. Moreover, in the chart the fort is named El Maleka, while the name El Kamaria is assigned to one of the forts on the right of the chain of works here, defending this approach from the west. In Colonel Outram's original sketch the fort in question is marked close to the lake, but as it is described by him as standing on commanding ground, and no such ground appears to exist on the south of the Mariout Railway, it seems, in spite of the strong evidence of the wet ditch, that its true position is near the central Fort Jessowreh or El Usura. Fort Kimareeyeh or Malcha is a strong lunette, the salient of which is formed by the remains of an old round tower; the flanks are drawn as parallel tangents to the circular head of the work. It stands on elevated ground commanding the lake and the country in front towards the El Meks line. The ditch is about 15 feet wide at bottom, 30 at top; depth about 13 feet; scarp and counterscarp, which is carried up to the crest of the glacis, unrevetted. The gorge is closed by defensible barracks, with central entrance gates approached by a drawbridge.

The powder-magazine is under the north flank parapet. Armament 13 guns.

(c.) *Unfinished Right Flank Fort.*

(Marked 7 on Map 1.)

Of the three forts on the right flank, the most westerly was unfinished in 1852, the foundations only having been laid and the works stopped; whether or not it has since been proceeded with, there is no information to show; but as the fortifications have in general been allowed to decay rather than been strengthened, it is probable that nothing further has been done. The most recent Admiralty chart does not mark it. In 1841, Major Napier, 46th Regiment, reported it in the same condition as Colonel LeMessurier in 1852.

(d.) *Fort El Goomeereyeh or Kamaria.*

(Marked 8 on General Map—Plan F, General Map 1.)

Next to the above comes a small square fort of about 35 yards side. In the Admiralty chart this fort is called El Kamaria, while in Colonel LeMessurier's note and the accompanying plan, dated May 1850, it is named El Goomeereyeh; in the General Map I, and Detailed Plan F, no name is given to it. On the north the front has been broken outwards, and follows the outline of the rocks. In the south-west angle are barracks, and adjoining the south-east angle is a square tower of about 40 feet side and 22 feet height. The entrance gates are in the centre of the south side between the tower and barracks. A wall and parapet of masonry, 6½ feet thick, runs round the work, with a terreplein 22 feet wide, raised about 6 feet above the level of the ground. The north face

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mounts 6 guns; the east face 4; the west face 2; total 12 guns, firing through embrasures cut in the wall; and one mortar. The rocks of the north and east sides are washed by the sea.

(e.) *Fort Oomecbeybey or Omukh-Kubebe.*

(Marked 9 on General Map 1—Plan G, General Map 1.)

Behind the work last named is Fort Oomecbeybey, a large irregular work built on the rock, and standing about 80 feet above the sea-level, and about 50 yards from the water. It is called in the Admiralty chart Omukh-Kubebe, while, strange to say, in his notes Colonel LeMessurier names it El Koobrah. The principal, *viz.*, north and south, fronts of this work are broken inwards in order to bring a cross-fire on the eastern channel or entrance to the harbour, and on the isthmus; they recede towards the centre so far as to leave only a narrow passage covered by a traverse with gates, which thus divides the work into two courts. The western court contains large infantry defensible barracks, the eastern court has artillery barracks and magazines. The whole work is surrounded by a ditch about 22 feet wide (excepting on the east side, where it is nearly 50 feet), and varying in depth owing to the irregularity of the ground from 5 to 35 feet. The scarp is carried up to the superior slope. The south and east sides of the eastern court are enclosed by a 16-feet thick masonry wall; otherwise a stony earthen rampart runs round the whole work, and is mounted with guns *en barbette*. In the centre of the east side are the entrance gates, with casemated barracks on the south, and store-rooms with powder-magazines on the north. This entrance is covered by a detached lunette, called Fort Quamarie, which contains additional barracks both in the interior and at the gorge; the work has no ditch. The various faces and flanks into which the north side of the main work is broken mount 30 guns and 1 mortar; on the south side there are 13, and on the west 10, total 53, some of which bear east. The lunette has 1 gun only at the salient.

6. *Batteries established between the El Meks Lines and the Chain of detached Forts described above.*

Between the El Meks lines and this chain of detached forts, placed at intervals of about 400 yards, are two martello towers and batteries commanding the sea front, the more westerly mounting 10, the other 9, heavy guns. The most recent Admiralty chart shows a continuous line of works connecting these towers and batteries with the El Meks lines, and extending to within a couple of hundred yards of the right flank of the detached chain of forts above described.

Another tower and battery mounting 8 guns is established about 1,200 yards east of the chain of forts last mentioned, between them and Fort Saleh Aga, which latter stands 1,000 yards west of the south-west angle of the town of Alexandria, and 600 yards east of the battery.

7. *Fort Saleh Aga.*

(Marked 10 on General Map—Plan G, General Map 1.)

Fort Saleh Aga was originally built by the French, but has since been added to; the old fort was a square redoubt facing the harbour, of about 120 yards side, taken along the scarp line, and having its west and south fronts broken outwards. To cover the entrance gates on the east front, a new work has been added, in the shape of an irregular lunette with salient pointing south-east, while in a north-easterly direction a long traverse of about 170 yards and defilading the interior of the lunette connects from the north-east angle of the redoubt with a battery commanding the old harbour and bringing a cross-fire on the channel or harbour entrance nearest to the town. A wide ditch, mean width about 50 feet, runs along the whole front and round the redoubt and the south flank and face of the lunette. The escarp is very solidly revetted in masonry, and is carried up to the level of the terreplein, or bottom of the exterior slope, which is on the same level. The bottom of the ditch is about 15 feet below the level of the ground, except in front of the east face of the lunette, where it is on the same level; the ground is irregular, and the glacis is formed by scarping the hill. The terreplein of the rampart is about 9 feet above the level of the ground, and ends towards the interior in an upright wall. Between the north-east flank (only a traverse) of the lunette and the artillery barracks forming the south-west side of the battery, another traverse is thrown up covering the road, connecting the redoubt with the battery, from the land side. The gorge of the battery is a plain wall with central gates running between the two ranges of barracks forming its sides. Immediately beyond the east face of the lunette, where the bottom of the ditch is on the level of the ground and parallel with it, is a range of defensible barracks. The redoubt has also barracks in the south-east angle covered from the west by a traverse running due north and south, at the north end of which, about the centre of the work, is the powder-magazine. The redoubt mounts 10 guns, 4 on the north side firing towards the harbour, 5 on the broken side facing west, and 1 on the broken side facing south; this gun is placed west of the central traverse; there are no guns mounted

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on that part of the south front east of the traverse. The redoubt has, however, space for 3 more pieces.

The lunette has space for 8 guns, but none were mounted.

The battery has 3 guns. There are also 2 mortars.

B.—Works on the sea front commanding the sea approaches and the Eastern Harbour.

1. *Fort Ras-et-Teen.*

(Marked 11 on General Map—Plan I, General Map 1.)

At Point Eunostos or Light-house Point, the eastern point of the west (old) harbour, is a strong square bastion fort, called Ras-et-Teen. The fort is built on the rocks, and is encircled on all but the east (land) front by the sea. The terreplein is about 30 feet above the level of the sea. The rampart terminates in a solid masonry scarp, carried up to the foot of the exterior slope on the same level as the terreplein. The principal faces front west and north, the western mounting 37 guns bearing on the central and east (or small) entrances to the harbour; the northern 28 guns, bearing on the sea approaches. On the south face, bearing on the harbour, 16 guns are mounted: the fort also contains 7 mortars. The distance between the salients of the bastions on the west front is about 120 yards; the north and south fronts are about 220 yards long. The work may be said to consist of two nearly equal parts, the western or sea front surrounded on the south-west and north sides by the rampart, and the eastern court, the terreplein of which is slightly raised, enclosed on all sides by large defensive barracks for 1,000 men; the rampart of the west half of the fort is continued in front of the north side of this court; the east side is shut in by a double line of barracks with central gates; and on the south side is a loopholed musketry wall, while at the north-east and south-east angles irregular bastions or defensive caponiers are thrown forward, affording a cross-fire of musketry on the east and south fronts. In the central of the west half of the fort is the light-house, 90 feet high, and between it and the south front are large defensible store-rooms. A powder-magazine is placed under the rampart of the north front, and a second in the south-east angle of the west work.

A vaulted passage leads to the sea under the curtain of the west front. In the south front a passage is cut through the rampart, leading to a wooden pier.

2. *Batteries.*

(Marked 12 and 13 on General Map.)

Eastward from Ras-et-Teen a continuous line of heavy batteries extends in front of the palace and harem for about ¾ mile along the rocky coast as far as the point in front of the hospital: these batteries are reported to mount some 34 guns with several mortars. From this point the coast recedes and forms a shallow sandy bay terminating on the eastward in Quarantine Island, about ½ a mile west of the Pharos.

3. *Fort Ada.*

(Marked 14 on General Map—Plan J, General Map 1.)

On this point or island (it connects with the mainland by a road carried on a masonry causeway along a very narrow tongue of land) is Fort Ada, an irregular four-sided work, the principal faces pointing north-west and north-east, so as to bring a cross-fire westward in front of the batteries about Ras-et-Teen and eastward in front of the Pharos. The south-east and south-west fronts are enclosed by defensible barracks. The angle of the north-west and north-east fronts is traced as a bastion, in rear of which is a cavalier, with solid masonry scarp, having one face parallel with the gorge of the bastion, the others parallel with the north-east and north-west fronts of the fort, terminating at the gorge, where it is approached by a ramp, in an upright wall. The terreplein of the cavalier is about 12 feet above the terreplein of the work itself, about 12 feet above the level of the sea. At the south end of the north-west front is a second cavalier or elevated platform, the principal face being a prolongation of this side of the fort, while one flank runs back at right angles and commands the bastion, and the other flank is thrown back at an obtuse angle.

The fort has no ditch; the exterior slope of the rampart, which is pierced with embrasures and terminates towards the interior in a nearly upright wall, is prolonged to the rocks.

Colonel LeMessurier in his notes gives the armament of this fort at 15 pieces for the two tiers of guns, the lower tier, *viz.*, that of the low rampart, being *à fleur d'eau*. In the plan no details of the armament are given, but embrasures are marked out in the lower tier for 22 pieces, and there would probably be space in the cavalier and elevated platform for half as many more.

4. *Lunette near Fort Ada.*

(Marked D on General Map—Plan K, General Map 1.

Immediately south-east of Fort Ada, lying between it and the Pharos, and placed, so to speak, at the apex of the re-entering angle contained between Quarantine Island, the projecting point formed by the mainland and the Pharos Island is a new lunette, connecting by masonry

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causeways with Fort Ada and the Pharos. This fort commands the sea approaches to Fort Ada and to the Pharos; it is built of stone 20 feet high, and is surmounted by an earthen parapet 8 feet high. From the inner extremity of the left flank (the fort is placed on the right of the flat headland, here some 250 yards across) a loopholed wall, 5 feet thick, 12 feet high, and 130 yards long, with loopholes 5 feet apart, runs across the headland, parallel with the shore, and facing the sea; behind this, at about 20 yards, is another masonry wall defilading from the rear. In the prolongation of the right flank of the lunette, *i. e.*, running parallel with the shore in a south direction, a similar loopholed wall extends for about 220 yards, when it connects with an earthen battery facing east, *i. e.*, bearing on the new harbour.

The gorge of the lunette is closed by a masonry screen 69 yards long, forming a re-entering angle with central gates.

The masonry causeway, 150 yards long, connecting with Fort Ada, is *à fleur d'eau;* that connected with the Pharos is a solid structure of masonry with parapet 20 feet thick, and raised about 16 feet above the water-line; the roadway is 40 feet wide, 8 feet below the crest line, and 4 feet below the banquette; this causeway has passages to admit of the water flowing freely through.

The lunette mounts 4 heavy guns and 3 mortars; the battery 7 heavy guns.

It was intended to run a rampart down the shore line on the west side of the headland, but whether this has been done is uncertain.

5. *Fort Boorg el Ziffir, or Pharos Tower.*

(Marked 15 on General Map—Plan L, General Map 1.)

The Boorg el Ziffer, or old Pharos Tower, stands on a rocky island connecting with the mainland by the masonry causeway described above. This work had been very considerably strengthened in 1852, and presents a formidable bulwark completely commanding the new harbour and the approaches to it. It is a square masonry fort, facing nearly due north and south, the north and south faces being about 120, the east and west about 150 yards long, taken in a straight line (practically they are somewhat broken and irregular), with circular Saracenic towers projecting from the walls, and containing in the great interior court an old square Saracenic tower and mosque, in the south-west angle of which is the light-house. It mounts two tiers of guns on all sides, the lower tier in vaulted chambers, *à fleur d'eau,* which, more especially on the sea faces, *viz.*, west, north,

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and east, comprises guns of the heaviest metal. The upper tier fires through embrasures cut in the wall. The extreme height of the walls above the water-level is about 40 feet; the vaulted chambers are about 14 feet in height and the same in width; thickness of masonry between the chambers about 4½ feet; at the point of the arch about 5 feet; the chambers are covered with about 10 feet of earth, taken from the point of the arch. The armament was reported by Colonel LeMessurier at 93 pieces including 7 mortars, besides 40 fuzils de rampart. The point of attack is at the north-east angle.

Commanding the new harbour on the east side are the El Silsileh Fort and the Pharillon Tower with an adjoining battery. The former is placed on a projecting point of the mainland, but nevertheless isolated from the land by a dry ditch, running from west to east, walled in each side from sea to sea, and flanked at each end by loopholed towers. The Pharillon Tower is built on the Pharillon Rock, bearing about 500 yards north-west of El Silsileh, and connects with the latter by a strong masonry causeway raised on the ledge of rock.

6. *Fort El Silsileh.*

(Marked 23 on General Map—Plan M, General Map 1.)

El Silsileh consists of a Martello tower and surrounding batteries. The tower is about 25 feet high and 39 feet in diameter, has one row of loopholes, and bomb-proof cover for one gun. Round it are two somewhat square batteries or platforms, the terreplein of the upper being 30 feet above the sea-level, about 60 feet wide, and about 11 feet above that of the lower, which is about 40 feet wide. The parapet is in each case 18 feet thick, and is pierced with embrasures.

The double battery extends on three sides, those facing roughly north-east and west; on the south (land side) the exterior slope of the upper platform is carried down at a slope of $\frac{1}{1}$ to the level of the ditch, 10 feet above the sea-level; this ditch, as mentioned above, isolates the fort from the mainland; it runs from sea to sea, is about 110 yards long and 25 feet wide, and is walled in on each side by casemated galleries 10 feet high, loopholed to fire into the ditch, and flanked at either end by loopholed towers or caponiers.

The tower mounts 1 gun, the upper battery or platform 5 heavy pieces, the lower battery 13, but has space for 24.

Along the left (west) face of this work is a road communicating northward by the causeway with the Pharillon, and south by a covered way with the mainland. In the south-east and north-west angles of the upper battery are small barracks; in the south-west the powder-magazine.

7. *The Pharillon.*

(Marked 24 on General Map—Plan N, General Map 1.)

The Pharillon is a square or rather rectangular masonry tower, the longer sides, extreme length about 90 feet, facing north and south, and the shorter sides, extreme length 60 feet, facing west and east; the extreme height is about 38 feet; thickness of outside walls 10 feet; between chambers 4½ feet. It mounts two tiers of guns, 6 upon the basement floor, 4 of which in vaulted chambers on the north side, that, namely, facing the open sea, and 2 on the south side; and 12 on the upper floor, of which 4 each on the north and south sides, and 2 each on the east and west sides.

The wall of the lower floor is pierced for loopholes only on the south front, two in each chamber, one on either side of the embrasure. Between each embrasure, on the long sides of the upper floor, the wall is pierced with three loopholes; on the short sides there are six loopholes between the two embrasures and one on the outer side.

The powder-magazine is in the south-west angle of the basement floor.

Immediately in rear of the Pharillon and connecting with the rock on which the tower is built by wooden bridge, is an 8-gun battery, *à fleur d'eau*, facing and commanding the new harbour.

C.—Enceinte and included works, more especially bearing on the approach from Aboukir, with the detached forts on the south front bearing on Lake Mareotis.

1. *Enceinte.*

(*a.*) *Rosetta Gate Side.*

(Marked 19, 20, 21, 22, and 25 on General Map—Plans O and P, General Map I.)

The entire eastern face of the old Saracenic walls, which enclosed the old town of Alexandria on the land side from Cleopatra's Needle about the centre of the new harbour to the Water Gate in the old harbour, has been enclosed by a double line of works enveloping the north-east and south-east angles of the old wall, between which the Rosetta road passes by the Rosetta Gate, and extending for about 350 yards along the north and south faces. This double line of works is traced on a bastion system with tenailles, and presents two ditches and two lines of ramparts, about 40 yards apart. In connection with these works two forts,

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known as those of El Yahoudieh and El Muisharia (marked 21 and 20 on General Map 1), were established on the highest ground beyond the old Roman tower, near Cleopatra's Needle (where the old Saracenic wall rested on the sea), in the direction of the old Lazaretto (now the Quarantine), on the supposed site of the palace of the Ptolemies, and enclosing the angle left between the north face of the old wall and the sea. These works stand about 70 feet above the sea-level and command the sea (harbour) front on the north, the land to the east, the town and all the old works to the south: they are entirely isolated from the main walls by a deep ditch which encircles then on three sides, while the fourth (sea front), about 400 yards long, is bounded by a rocky cliff and the sea, and is moreover further protected by a Martello tower and battery, placed beyond the ditch on a point of land projecting about 150 yards to the north from the north-east angle. They are only commanded from the citadel (Fort Bonaparte) and the Windmill Fort, called Kom-el-Deek.

The El Yahoudieh and Muisharia works mount 34 guns. No defensive works exist between the Martello tower above mentioned and Fort Silsileh, already described in connection with the Pharillon. West of the old Roman tower near Cleopatra's Needle (the sea front of the line of works runs east from the Needle to the Martello tower just mentioned), a strong sea-wall about 500 yards long has been built, terminating in a heavy battery (No. 17) in front of the Frank Square, and having another battery (No. 18) about intermediate between the two extremities. With the exception of this defensible line of about 1,000 yards, there are no other shore defences to the new harbour to the westward till you come to the heavy 7-gun battery (No. 16) connecting with the new lunette, near Fort Ada, a distance of about 2,000 yards. The principal defences of the new harbour are thus: the Pharos, Fort Ada, Forts El Yahoudieh and Muisharia, with the intervening coast batteries, and the Pharillon, with Fort El Silsileh. All these completely command the harbour.

A canal is cut from the sea to fill the ditch of the new double line of works extending on both sides of the Rosetta Gate, having a dam and sluice to regulate the height of water in the ditch, which is about 8 feet lower than the level of the canal.

This double line of works (there are five bastions marked 25, 25, 25, 25, 25 on General Map 1) now presents the strongest front (formerly the weakest) of the walls enclosing the city (*vide* Admiralty chart, not

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shown in Colonel LeMessurier's General Map 1), and is intended, in conjunction with the Tibia el Nishau, a recently executed entrenched line thrown up on the high ground, about 1,000 yards beyond, *i. e.*, east of the walls, and extending from the sea to the Rosetta road, a front of about 1,200 yards, to obstruct any advance from the eastward.

(*b.*) *South Side.*

(Plan P, General Map 1.)

From the point where the double line of works stops, the defences consist of a single line of rampart with occasional bastions, following the course of the old walls to the Water Gate on the West Harbour. The triangular bastion (marked R on General Map) at the south-west angle has been considerably strengthened and added to. A wide dry ditch runs along the entire front with solid masonry scarp, and crossed at the curtain angles of the bastions by loopholed walls to defend the ditch in front of the salients. Beyond the ditch is a covered way, with traverses between it and the counterscarp. This part of the enceinte is traversed by four principal roads passing through the curtains by the Bal el Tudreed, Bal el Sidra, Bal el Mimeh, and Mamoudieh Gates (marked 27, 28, P, and 29 on General Map 1, marked respectively Maharambee, Nile, Mahmoudiyeh, and Gabari Gates on the Admiralty chart).

(Plan Q, General Map 1.)

This last is the strongest and most important, and contains large two-storied casemated barracks, accommodating 1,200 men and pierced on the lower storey for guns; it is within a very short distance of the western harbour, and is the main approach by the Mahmoudieh bridge crossing the Mahmoudieh canal from the westward: the ditch is here 43 feet wide and 30 feet deep. At the Bal-el Tudreed (marked Maharambic on Admiralty chart) are large casemated barracks, and between it and the double line of works at the Rosetta Gate are the principal powder magazines, from which the expense magazines are supplied.

2. *Included Works.*

(*a.*) *Fort Bonaparte.*

(Plan P, General Map 1.)

The principal forts within the walls are the citadel (fort Bonaparte or Cretin) and the Windmill Fort or Kom el Deek, both of which stand on high ground and command on all sides. The latter, it may be observed,

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is not shown on the most recent Admiralty chart, and it is possible that it may have been removed.

Fort Caffarelli, which stood on elevated ground near the new town, and commanded the western harbour, was reported by Mr. Badger in 1861 to be in ruins and destitute of armament, and it was rumoured that the site had been given over to some French gentlemen on condition of removing the mound on which it stood. It is, however, still shown in the Admiralty chart.

Fort Bonaparte is built on a mound raised 200 feet above the level of its own base, and stands between the Rosetta road, which traverses the centre of the old town from west to east, and the enceinte near the Bal-el Tudreed Gate. It is a strong lunette, with walls 40 feet high, the salient pointing south-east. At the gorge are casemated two-storied (in the centre three-storied), the lower stories pierced with embrasures for guns. Beyond the escarp is a covered way leading down to the Rosetta road on the north and the Bal-el Tudreed Gate on the south; and round the base of the mound, following the contour of the ground, is a strong line of rampart extending along the entire front from road to walls, known as Fort Kom el Dimas.

The citadel is calculated to contain 40 guns, but it is probable that the works collectively could mount from 50 to 60 heavy pieces.

(*b.*) *Windmill Fort.*

(Kom el Deek.)

The Windmill Fort (Kom el Deek), and advanced flèche facing east, with earthen parapet, stands on ground about 150 feet above the sea level and about 600 to 700 yards east of the citadel, close to the gorge of the last bastion of the double line of works covering the east front. It is calculated to contain 30 guns. In the interior is a windmill forming a prominent landmark, which gives the name to the fort.

3. *Detached Works on south front, bearing on Lake Mareotis.*

The Mahmoudieh Canal is carried round the south wall at a distance averaging from $\frac{1}{2}$ to $\frac{3}{4}$ of a mile and within 150 to 200 yards of Lake Mareotis. Between the walls and the canal are a chain of detached forts; the most westerly (called in the Admiralty chart El Enneb), Fort Kaimous (marked A on General Map 1), is placed in the bend of the canal, and is built on a part of the ridge on which Pompey's Pillar stands (Plan R, General Map 1). It is about 100 feet above the level of the canal, and about 450 yards distant from it, and commands the canal from the south and west faces.

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In shape it is a lunette, the salient pointing south-east; the rampart is of solid masonry, the banquette being formed in two steps, and the superior and interior slopes alone being of earth; the escarp is carried up to the superior slope, is 25 feet high, with a slope of about 1 in 2·5. The ditch is 22 feet deep and 45 feet wide at bottom, beyond which is a glacis, formed by scarping the hill, and extending all round the work. The gorge is closed by a loopholed wall, with central gate, covered by a screen 8 feet high. In the interior of the work is a round tower 40 feet high loopholed in two stories, and mounting one gun.

To the right, *i. e.*, eastward of this fort (see Plan P, General Map 1, marked e, f, g, and h), but closer into the encircling walls, are a series of field-works, towers, lunettes, and flèches, mostly of earthen parapets with masonry scarps, and placed on mounds or elevations rising from 40 to 60 feet above the lake level; the greater part of these are grouped together in front of the south-east angle of the old walls and connect with the enceinte by a system of covered ways leading from the extreme bastion of the double line of works covering the east front.

About 300 yards south of the canal and 300 from Lake Mareotis, and bearing about ¾ mile east of Fort Kaimous, is another fort (see Plan S, General Map 1, marked i on General Map), commanding both the lake and the canal, and intended to obstruct the approach of gunboats. It is a regular octagon, each face being 135 feet, and presents a double line of rampart and two ditches. The inner rampart is of solid masonry, rising about 15 feet above the terreplein, and surmounted by an earthen parapet 8 feet high and 18 thick. The berm is 20 feet wide on a level with the terreplein, the ditch about 12 feet deep and 35 wide at bottom, with masonry escarp; the counterscarp is not revetted. The outer rampart is a glacis 200 feet wide, surrounded by a ditch 50 feet wide and 10 deep. In the centre of the work is a round tower, 20 feet high and 40 in diameter, which is not seen from the glacis. The entrance is in the west front by a passage cut through the glacis, the bridge over the outer ditch being 50 feet long and 18 wide, the bridge over the inner ditch, 40 feet by 10, and protected by two casemated embrasures 10 feet from the ground. The door in the wall of the ramparts 11 feet wide, and 8 feet is clamped with iron.

Armament unknown.

II.—DEFENCES OF ABOUKIR BAY.

Between Alexandria and the Rosetta Boghaz are a series of forts and towers commanding Aboukir Bay, the principal of which are Fort Aboukir

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and Fort Koum el Moucheh. Lake Edkoo formerly connected with the sea by the Edkoo Boghaz, but this has now become closed, and the lake appears to be gradually drying up. At the Edkoo Boghaz it was intended to erect a strong fort at the time of Colonel LeMessurier's visit in 1850, and the Admiralty chart shows a work on the east of the old mouth of the lake.

Commencing with Aboukir Point on the left, there appear to be in all four forts and five Martello towers commanding the bay, the fort on the east of the old Edkoo Boghaz being on the extreme right.

1. *Fort Aboukir.*

Fort Aboukir stands on the rocky projection known as Aboukir Point, and connects by a covered way with Koum el Moucheh, about 540 yards to the south-west. It presents a circular front on the east and a similar front to the north, while the straight south front is thrown sufficiently forward to allow room for one gun to flank the tangent of the east circular front; the gorge on west front is closed by a straight wall with flanking towers.

The surrounding masonry wall is 24 feet high and 8 feet thick; the rampart is raised 15 feet above the terreplein of the fort, and is 28 feet wide, exclusive of revetments; access is gained by ramps; beneath are bomb-proof chambers.

The wall is pierced with embrasures for 40 guns, of which 15 on the arc of the east front, 6 on the arc of the north front, 4 on the south front, and 9 on the west front or gorge; each of the flanking towers has 3 guns. The point of attack is at the re-entering angle formed by the east and north fronts.

The gorge is covered by a ravelin in the ditch; the approach is by bridges crossing the main ditch and ditch of ravelin to the entrance gates of the gorge; the faces of the ravelin are loopholed to command the communication with Fort Koum el Moucheh.

Width of main ditch 45 feet; ditch of ravelin 17 feet; the counterscarp at the salient of ravelin is 120 feet from the entrance gates of the main work.

In the interior of the fort is a round tower, 44 feet high and 60 feet diameter, having a bomb-proof terrace for a 6-gun battery.

2. *Fort Koum el Moucheh.*

Koum el Moucheh is a masonry lunette, pointing west: length of face 290 feet, flank 130 feet, taken along the crest; the ditch is wet, 45 feet wide and 20 deep below the scarp line. Masonry caponiers cross the whole width of the ditch at the shoulder angles. At the gorge the ditch (here about 100 feet wide) is provided with large defensible barracks in the form of a tenaille, through which the covered way connecting with Fort Aboukir passes.

The terreplein of the rampart is 30 feet wide and raised 8 feet above the terreplein of the fort, terminating in an upright wall. The parapet is 18 feet thick, the interior slope revetted with masonry; the exterior slope is at 45° and meets the crest of the scarp at the plane of the terreplein of the fort. Beyond the ditch is a platform 35 feet wide, on the same level as the terreplein of the fort, provided with a parapet, which slopes down to the plane of the ground.

The armament is stated at 18 guns of various sizes on each side.

3. *Fort El Agouzeh.*

About a mile further south is a fort called Koum El Agouzeh, between which and the fort at the old Edkoo Boghaz are the five Martello towers enumerated above.

El Agouzeh is a square redoubt of about 350 feet side taken along the crest line: the ditch is wet, 50 feet wide; height of masonry escarp and counterscarp about 35 feet. The entrance on the north side is through loopholed chambers, covering the bridge and passage. In the centre are defensible barracks; and on the south side are extensive defensible buildings constructed as quarters for Ibrahim Pacha. The powder magazine is under the rampart at the north end of the west side. Beyond the ditch is a covered way, with wide terreplein, the glacis sloping rather steeply down to the sea on that front. The armament is given at 24 guns, *viz.*, 12 on the east and the same number on the west fronts.

There are no details with regard to the towers or the new fort at the old Boghaz of Lake Edkoo.

III.—DEFENCES OF THE ROSETTA BOGHAZ.

The defences of the Rosetta Boghaz consist of Fort St. Julien and the western and eastern forts. The latter are placed close to the embouchure of the river, and are about 750 yards apart. Fort St. Julien stands on the left bank, about 3 miles and 5 furlongs from the western fort, and about 3 miles north of the town of Rosetta.

1. *Fort St. Julien.*

(Plan A, General Map IV.)

Fort St. Julien is a rectangular bastioned fort, the curtains of the west and east fronts being 140 feet, of the north and south fronts 75 feet long. The bastions are 30 feet high, and have faces of 65 feet, with a parapet 9 feet thick ; the curtains are 4 feet lower with the same thickness of parapet; angle of superior slope 20°. The revetments are of masonry. The ditch is 30 feet wide, and has a cunette 10 feet wide and 6 deep ; height of counterscarp 12 feet, of which 8 feet from the bottom of the ditch is revetted with masonry, the remainder is of earth. The glacis is 100 feet wide and 12 feet high ; on the east front, the counterscarp is prolonged from the north and south fronts to the river, which flows within 20 feet. The gateway in the curtain of the south front is covered by a screen of masonry in the ditch 12 feet high and loopholed to command the passage cut through the glacis.

The armament is given in the French notes at 16 pieces and 6 mortars, with 20 fusils de rampart.

2. *The Eastern Boghaz Fort.*

(Plan C, General Map IV.)

The eastern fort is a square work of 220 feet side, taken along the scarp line. The rampart of earth is, inclusive of revetment and interior slope, 50 feet broad, and has a parapet 25 feet broad and 4 feet high ; the terreplein of the rampart is 15 feet, and interior slope 6 feet; the banquette of the parapet is 3 feet wide and 4 feet high; the masonry escarp is carried up to the superior slope. The ditch is 75 feet wide and 4 feet deep, with 3 feet of water ; beyond it is a glacis, 30 feet wide, with a counterscrap of earth 6 feet high. In the interior is a round tower, 40 feet high and 36 feet diameter, with 3 tiers of loopholes and a bomb-proof terrace. The entrance is on the river front, the bridge over the ditch being 8 feet wide, and defended by a large casemated store-room loopholed on each side of the passage, and having four embrasures to flank the bridge. A causeway 100 yards long leads to the river. The French notes on the intended armament give the number of guns at 25 heavy pieces, 6 mortars, and 30 fusils de rampart.

This fort, as also the western fort, is situated in very low swampy ground (a salt marsh) overgrown with tall reeds.

3. *The Western Boghaz Fort.*

(Plan B, General Map IV.)

The western fort is very similar in trace to the eastern; it is a square work of 220 feet side taken along the scarp line. The rampart is of solid masonry, and raised 6 feet above the terreplein of the fort; it is

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20 feet wide on the north and east faces, and 15 feet on the south and west, and has an interior slope at 45°. The parapet of earth is 4 feet high and 25 feet thick; the superior slope is carried down to the level of the terreplein of the rampart, where it terminates in an upright escarp; the interior slope is revetted with masonry. The ditch is 75 feet wide, and contains 4 feet of water; on the east side the escarp is washed by the river; two batardeaux are placed across the ditch in the prolongation of this face 4 feet thick, and reaching nearly to the level of the fort walls. Beyond the ditch is a glacis. The entrance is in the centre of the south face. In the centre of the fort is a round tower, 40 feet high and 36 feet diameter, with bomb-proof terrace and walls, 5 feet thick, and having three tiers of loopholes. Adjoining the rampart of the east face are two-storied masonry barracks, the floor of the upper storey being on level with the terreplein of the rampart. The powder magazine is in the north-west angle.

The armament is given at 23 heavy guns, 6 mortars, and 24 fusils de rampart.

IV.—DEFENCES OF THE DAMIETTA BOGHAZ.

The defences of the Damietta Boghaz consist of Fort Lesbeh on the right bank, with a round tower opposite it on the left bank, and about 1½ miles nearer the mouth of the river, of what are known as the eastern (right bank) and western (left bank) Boghaz Forts; the latter stand about half a mile from the embouchure, and 865 yards apart.

1. *Fort Lesbeh.*

(Plan C, General Map. VII—Colonel LeMessurier's Series.)

Fort Lesbeh is an irregular square bastioned fort, the south-west, north-west and north-east fronts having each an intermediate demi-bastion, making in all seven bastions. The length of side is roughly about 125 yards, the western (river) side being somewhat longer. The parapet of the bastion is throughout 4½ feet high and 12 feet thick, terminating in an upright wall at the escarp; the platform, which in general fills two-thirds of the gorge of the bastions, is raised 10½ feet above the terreplein, and contains beneath bomb-proof chambers. The curtains of the south-east and south-west fronts, the former 224, the latter 110, feet long, are loopholed along half the height; the height of the parapet above the plane of the fort is here 18 feet, *viz.*, 3 feet higher than that of the bastions; the rampart is 10 feet high and the same wide; the thickness of the parapet for 7 feet from the top is only 3 feet. The surrounding inner wet ditch is 40 feet wide, except in front of the bastions, where it is only half the width, and has a covered way, varying in width from 5 to 20 feet, to allow room for a battery, at about half the height of the counterscarp above the high water-level; beyond this is the glacis, 50 feet broad, sloping down to near the water of the outer ditch, which is on about the same level as that of the inner ditch. The inner ditch was reported in November, *i. e.*, about the time of high Nile, to be 5 feet deep in the centre, when the level of the water was about 2 feet below the terreplein of the fort; this would imply an escarp of about 22 feet in the curtains and 3 feet less at the bastions. The depth, of course, varies with the state of the Nile; in April, *i. e.*, about the time of low Nile, it was reported to be dry for about one-fourth of its breadth on each side, the level of the water being 2 feet lower, and the depth in the centre consequently 3 feet. The ditches were to be deepened and improved. The glacis is provided with 3 places d'armes, 2 on the north-east, 1 on the north-west, front. The outer ditch is 30 feet wide, and depth probably the same as in the inner ditch; beyond this is another glacis, the crest of which is about 4 feet above its covered way.

Covering the gate in the centre of the curtain of the south-west front is a 10-gun battery on the river bank and on the level of the terreplein of the fort. The principal entrance is in the curtain of the south-east front, which is the weakest part of the fort, the line of approach being commanded by only a few guns, while a heavy fire could be directed on the other fronts.

In the interior are casemated barracks and other buildings, some surmounted by a parapet, and containing three tiers of loopholes. There is a bomb-proof powder magazine in the south-east angle of the fort, and various smaller expense magazines.

The fort was originally pierced with embrasures for 42 guns, the north-west front having 11, the north-east front 8, the south-east front 6, and the south-west front 10, besides one in the salient angle of each bastion; but these have been closed, and all the guns are now mounted *en barbette*. This is exclusive of the 10-gun battery in front of the curtain of the south-west front. Great attention was being directed to the strengthening of this fort in 1850, when Colonel LeMessurier's notes were taken, and it is probably now a very strong fortress. The ditches more especially have been deepened. In the French notes the armament of Fort Lesbeh is given at 58 heavy guns, 12 mortars, and 40 fusils de rampart.

GSL

The river is here 290 yards wide; the distance from the minaret in Fort Lesbeh to the town of Damietta is given at 6 miles, the distance between the minaret and the fort opposite it on the left bank about 300 yards.

2. *Round Tower opposite Fort Lesbeh.*

This fort is a massive Martello tower, prepared for a gun *en barbette*, and pierced with three tiers of loopholes; at the base is a glacis with covered way. The French notes give the armament at 2 guns and 10 fusils de rampart.

3. *Eastern Boghaz Fort.*

(Plan B, General Map VII.)

The Eastern Boghaz Fort is a square masonry work with circular towers at each angle, except the south-west, which is square, and rectangular towers (called square bastions in Outram's report) at the centre of the north and east sides. The length of side taken from the centre of towers is 165 feet. In the centre is a round tower, 38 feet high, 40 feet in diameter, with 5 feet thickness of wall, and having a bomb-proof terrace and two ranges of loopholed chambers: two guns are mounted *en barbette*. The rectangular towers or square bastions are 25 feet high in the side, and have a bomb-proof terrace 60 feet by 30 feet, intended for a battery of 5 heavy guns *en barbette* and 2 mortars; the chambers are loopholed. The circular corner towers are of the same height; the bomb-proof terrace is 26 feet in diameter, and has a loopholed parapet 3 feet thick, with a gun *en barbette*; in the upper chamber are three embrasures screened by the glacis; the lower chambers are loopholed to rule the ditch. The square tower at the fourth corner is much the same. The curtain, 140 feet long, has a thickness of 12 feet of solid masonry, and is 15 feet high inside; the rampart is 8 feet high, and is surmounted by a loopholed parapet 7 feet high and 4 feet thick.

The ditch is 40 feet wide; height of the counterscarp 15 feet above the water-level, stated to be 5 feet deep, and 2 feet below the terreplein of the fort. Beyond is the glacis, 140 feet wide, sloping, on all but the river side, to within 1 foot of the water of the outer ditch; on the river side it slopes away to the Nile. This outer ditch has a width of 30 feet, and is said to be the depth of two men's height, say 11 feet; the glacis beyond this ditch, 4 feet high, slopes away gradually to the country. The entrance is by a wooden bridge on the south front, near the square corner tower. The French notes give the armament at 16 guns, 8 mortars, and 12 fusils de rampart. The distance between the Eastern and Western Boghaz Forts is about 850 yards; the distance between the Western Fort and the Round Tower, opposite Fort Lesbeh, about 1¼ miles.

4. *The Western Boghaz Fort.*

(Plan A, General Map VII.)

The Western Boghaz Fort is a circular masonry work of about 130 feet diameter. In the centre is an old Arab tower, 40 feet high, two-storied, and with a bomb-proof terrace; thickness of wall at top about 5 feet, at the base somewhat more; both stories are loopholed; one gun is mounted *en barbette*.

Commanding the entrance to the river, *i. e.*, on the north-west, is a strong 8-gun battery, the platform of which is about 26 feet above the bottom of the ditch; parapet 4½ feet high and 8 feet thick; the face of the battery, which projects into the ditch about 12 feet beyond the curtain, has a gallery in the thickness of the wall, the loopholes of which are raised so as to rake the glacis; walls of the same height as the parapet branching off from the central tower, divide the battery from the interior of the fort, and are provided with stands on the inside from which to fire through the loopholes into the interior court. The battery can thus be completely isolated.

The remainder of the circular wall is divided into four curtains, by three projecting towers or square bastions; these towers are two-storied, with bomb-proof terrace roof, all loopholed; they are 24 feet wide, 35 feet high from the bottom of the ditch, and project 20 feet; each bastion can be completely isolated; the connecting curtains, 25 feet high from the bottom of the ditch, have a rampart 8 feet thick and 10 feet high, above which the wall is 3 feet thick, and loopholed at the same level as the loopholes of the gallery in the face of the battery, and the second tier, *i. e.*, upper chamber, in the bastions.

The ditch is dry, 40 feet wide at top, and 15 feet deep from the crest of the counterscarp, which is at an angle of 70°.

The glacis is 100 feet wide, and is given a slope up to the loopholes in the upper chambers of the bastions. Beyond the glacis is an outer ditch 20 feet wide and 10 feet deep.

The entrance is by a road cut through the glacis, crossing the ditch by a wooden bridge, and passing through gates in the curtain of the south-west and south bastions; it is commanded from loopholed chambers on each side projecting from the bastions. The French notes give the armament at 10 guns, 6 mortars, and 20 fusils de rampart.

CSL

V.—FORTIFICATIONS ON THE BARRAGE.

The Barrage of the Nile, originally designed for the purposes of irrigation,* forms the basis of a fortified chain of works (called the Saidieh fortress), which covering Cairo on the north, and commanding the great water communications of Egypt, possess great capabilities of defence.

The principal water communication of the country being carried on by the two branches of the Nile, a glance at the accompanying plan will show how admirably adapted this fortress is to command the approaches from that quarter. Independently of the projected power of the Barrage to flood the surrounding district, any vessel attempting the *ascent* of the river by either branch would be exposed to a galling fire from at least 150 heavy guns. The *descent*, as far as the southern extremity of the works, would be less dangerous; but when the sunken fort on the islet is erected (A), and the two flank works thrown out beyond the canals are completed (B, C), the approach, even from the southern side, would expose the assailants to great risks. The fort on the island was not commenced (in 1862); its position and tracing are given from memory (by the Rev. Mr. Badger), but Mr. Ayrton thinks the dimensions are smaller than in the office plan.

The Barrage works are thrown astride of five large water-channels, *viz.*, the Rossetta and Damietta branches of the Nile, and three artificial canals. They are thus divided into five principal parts marked respectively D, E, F, B, C, D; the central fort occupies the head of the Delta; it is bisected by the canal J,† and bounded east and west by the Nile. E and F are two wings lying between the branches of the Nile and the exterior canals G and L, and two flanks, B and C, are thrown out beyond these canals, protecting by their fire the weaker lines of the wings. The fort D and the *tete du pont* E, with its hornwork and cavalier B, were nearly completed in 1862. F and G on the eastern side of the river were not begun, but they are to correspond in every respect with those on the western side. Mr. Badger understood that some portion of the canal L had been excavated to within a mile of the Barrage.

If an imaginary point be fixed 1,000 yards due south of the central fort, the five channels may be viewed as so many lines radiating outwards towards the north. It is therefore towards the north that we find the largest fortified fronts and the greatest accumulation of guns. In 1862 there were 106 guns and 21 mortars mounted on the northern face of the central fort alone. Of all the faces the northern one of the central fort is alone protected by a masonry scarp and scarped musketry casemates.

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* For a description of the Barrage, see page xlvii. No information later than 1862.

† Menoufieh Canal.

The scarp stands about 10 feet above ordinary high Nile, and is said to be 30 feet below it; the thickness of the revetment, however, is not more than 3 feet. When Mr. Badger was there, 50 yards of it had fallen away during an inundation, the earth from the parapet and terrepleins filling the ditch and making quite a practicable breach between the bastion and curtain. The ditch along the north face is protected by tenailles, and an unfinished work, something between a covered way and glacis, is thrown out beyond the flank bastions. The original design further contemplates the flooding of the country in front of the northern face; nothing could be easier, with the command of water afforded by the two branches of the Nile and the central canal.

There are two communications from the ditch to the branches of the river at the north end, one on each side, with masonry batardeaux; the destruction of them would bring the water in the ditch to the level of the Nile below Barrage, whatever that was.

Profile.

With the exception of the northern front, the profile is almost uniform, as follows*:—

Elevation of parapets above berms and interior planes ...	25	feet.
Elevation of berms and interior planes above the proposed highest water level	4	„
Thickness of parapet	18	„
Superior slope	$\frac{1}{6}$	„
Exterior slope	45	„
Interior slope rather less than	30°	
Thickness of base of rampart	100	„
Width of berm	8	„
Width of terrepleins sufficient to admit the passage of carriages†		„

Width of ditches (wet) :—

At salient	50	„
At curtain	80	„
Depth (average)	12	„

Escarp and counterscarp at the natural slope of the ground.

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* *North Front.*—From Capt. Collinson's report and sketch, the masonry scarp is carried about 16 feet above the terreplein of the fort, and the depth of the water in the ditch at ordinary high Nile is shown to be 30 feet, the level of the water being then about 6 feet below the terreplein, giving the ditch a total depth of about 36 feet.

† From Outram.

Trace.

The trace of the works is irregular, and cannot be referred to any particular system.

Each principal face is broken by two bastions, in addition to those at the angles.

The trace of these bastions is flat, and as a rule the width of their gorges is equal to that of the intervening curtains.

The length of their faces is about 100 yards and their flanks about 60.

The two bastions (if they may be so called) between the flanks on the southern front are square.

The upper face of the parapet and the exterior slope of the lines (the superior and exterior slopes) are revetted with crude bricks, giving them a very finished appearance. Roots of dog-grass are planted between the bricks to increase the tenacity of this outer coating.

Powder Magazines.

The expense magazines are generally under the terrepleins of the bastions. They are protected by an arched roof of masonry from 3 to 4 feet thick, with 8 feet of rammed earth. This cover is considered adequate by the Egyptian engineers, but Captain Brabazon, R.A., questions in his report its standing a heavy and vertical fire. (*N. B.*—These remarks have still more force now, owing to the introduction of rifled mortars.) Three strong masonry magazines had been erected in 1862 in rear of the bastions on the eastern and western sides of the central fort, and a fourth was in course of construction. (See Plan a, b, c. d.) Immense quantities of shot and shell were piled up between these buildings, and the amount of ammunition stored in the fortress was reported to be considerable. Mr. Badger noticed that a part of the area enclosed within the work E was planted with the willow used in Egypt in the manufacture of gunpowder.

Armament

(According to Mr. Badger).

In 1862 the actual number of ordnance was as follows :—

	Guns.	Mortars.
Mounted on the central fort	256	71
Mounted on the work E	98	12
Dismounted in the work B	50	0
	404 +	83
		= 487
If the projected outworks C F, on the eastern side, are armed like the corresponding works on the western, *viz.*, with 148 guns and 12 mortars ...		160
The total armament of the fortress will be ...		647 pieces.

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The outworks E and B are capable of receiving a much larger armament, and Mr. Badger thought many more guns would eventually be mounted on them. The number of guns and mortars is indicated on the plan. The guns, which are crowded into the faces of the bastions, are mounted *en barbette* on wooden traversing platforms, the heaviest being in the salient angles. The mortars are chiefly in rear of the curtains. The guns are of cast iron, and range from the 32-pounder* up to the 10-inch. There is one mortar of 20 inches. It is planted on the interior plane in rear of the middle curtain of the central fort and a little to the right of the canal. A few of the smaller mortars are of brass. The carriages are well made and apparently very strong. Both guns and carriages are kept in good order and ready for use.

Traverses.

There are two traverses in each of the flank bastions of the central fort and six in the flanks of the outwork E.

Embrasures.

There are now eight embrasures, two in each of the re-entering angles of the bastions commanding the four gates of the central fort, but they are as yet without platforms or guns.

Entrances.

The four principal gates, e, f, g, h, of the central fort are in the final re-entering angles towards the Nile. In addition to these the works are pierced by small sally-ports, from which light bridges† could be thrown across the wet ditches. There are two similar sally-ports in the outwork E, marked severally k and m.

Outworks.

In addition to the cover afforded by the glacis already described, and which barely covers the flank bastions, some of the northern curtains are further protected by earthen tenailles in the ditches. These, and indeed all the slopes, are thickly planted with shrubs and even trees, and great quantities of dog-grass have been sown.

The tenailles, as shown by the plan, are in front of the outer curtains of the northern face.

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* Since the date of Outram's report, the Egyptians have purchased large numbers of Krupp and Wahrendorff guns, with which they have no doubt to a great extent armed their fortresses.

† Capt. Collinson mentions that in 1858 there were five bridges; they are made of wood and have drawbridges. The piers are of masonry, and there are masonry guard-houses.

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System of Defence.

The whole system of defence is based upon the inundating power of the Barrage, which so far seems rather doubtful of accomplishment; but it is certain that the existing defences would fail to protect the bridges from the fire of an enemy in possession of the open country. Even supposing the country completely inundated, a few light pieces mounted on gun-boats, or even rafts, could, according to Captain Brabazon, destroy one or two of the arches, which are not very solidly built, and with them would fall the military prestige of the Barrage. Mr. Badger, however, considers that even if the inundations were never effected and the arches destroyed, a direct attack upon the fortification, unless favoured by surprise, would be a serious undertaking.

With regard to the inundations, he considers it would be as damaging to the assailed as to the assailants, by cutting off their communication with the surrounding country, and thus placing them in a state of siege, with the prospect of speedy surrender.

Hence he does not believe that the strategy would be attempted, except in the hope of immediate relief. If in possession of the open country, and provided with rifled ordnance of long range, the assailants might safely and effectually silence the guns of the fortress, which are all of round bore and mounted *en barbette*;* or they might attack either of the northern faces by regular siege approaches. The soil is admirably adapted for the purpose, and no flanking fire could be brought to bear on the trenches. The fronts being unprotected by a glacis, the assault would be attended with comparatively little risk; and as the forts consist of a single line of works, the capture of one would ensure the speedy surrender of the other two, for both would then be open to enfilade.

Garrison.

Sir James Outram estimates that 15,000 men would suffice for the defence of the fortress. No barracks are to be built within the *enceinte*, the idea being that camps, which may readily be removed out of range of an enemy's fire, are preferable to fixed buildings, and that shot falling among them would do less damage and cause less sensation than when falling on stone buildings. There is something plausible in the conception, and it is open to no objection on the score of climate.

Area, &c.

The area of the central fort is about half a square mile, and the ex-

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* This refers to the armament of 1862.

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terior works taken together are of about equal extent. The north and south fronts of the central fort are parallel, and are 1,600 and 800 metres respectively. The east and west fronts are each 1,200 metres. The front of the central fort projects outwards towards the centre, and the flank forts continue the curve, forming together an imperfect semicircle.

N. B.—The accompanying plan will be found to approximate to the above measurement.

Store-houses.

Two large magazines for clothing, food, &c., marked n, o, in the plan, have been constructed. They are not bomb-proof, and might easily be set on fire. Besides temporary workshops, the only other buildings are two kiosks, occasionally occupied by the Viceroy, and a smaller kiosk, in one of the bastions of the fort E. There are also three covered water wheels for irrigating the enclosed area from the central canal.

Part of the design in connection with these works is to extend the Khatatbeh Canal, on which Alexandria is dependent for its water-supply during a great portion of the year to the Barrage, the canal marked G, between the outworks B and E, being its future head.

This will give the garrison in the Barrage Fortress the power of cutting off the water-supply from Alexandria during ten months of the year.

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1.

SAKÁYT EL ~~KUBLI~~ ON RED SEA (THE ANCIENT BERENICE) TO EL AGAITA.

BY THE ANCIENT ROAD.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	Sir G. Wilkinson (Murray).	Sakáyt El Kubli *or* Berenice.	...	...	...	...	... ...	Berenice stands on a small bay at the extremity of a deep gulf formed by the projecting point of Lepti Extrema, now called Ras Banas. The inner bay, which was the ancient port of Berenice, is now nearly filled with sand at low tide; its mouth is closed by a bank, which is thus left entirely exposed. The town was founded by Ptolemy Philadelphus, and called Berenice after his mother. Vetus Hydreuma about 4 miles off the road up a valley.
		Cœnon Hydrema.	16	4	16	4	... ...	... The distances are from Sir G. Wilkinson in Murray's hand-book. He gives them in Roman miles (1 mile=1,614 yards English). They are here reduced to English miles.
		Cabalsi ...	25	0	41	4	... ...	
		Apollonos ...	25	0	66	4	... ...	
		Phalacro ...	21	0	87	4	... ...	
		Aristonis ...	23	0	110	4	... ...	
		Jovis (Samúnt)	23	0	133	4	... ...	
		Compasi ...	30	0	163	4	... ...	
		Afrodito ...	20	0	183	4	... ...	
		Didyme ...	18	0	201	4	... ...	
		Phœnicon ...	22	0	223	4	... ...	
		El Agaita ...	13	0	236	4	... ...	This distance is measured on Keith Johnston's map.

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2.

BERENICE TO EL AGAITA AND THE NILE.

BY WADI SAKET (THE MODERN ROAD).

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	MURRAY. EDITN. OF 1858.							Sir G. Wilkinson (Murray) says— "The road now usually taken from the Nile to Berenice lies through the Wadi Saket. The ancient road from Coptos (Route 1) to that port passed through Wadi Matúli and other valleys that succeed it to the southward. "From the map given in Murray, compared with Keith Johnston, it appears that the road must follow the ancient one to a point somewhat short of Cabalsi, and thence diverge to the north up a valley between Jabal Hamada and Jabal Eultús to Saket Bender el Kebir, which is about 80 miles from Berenice. The Wadi Saket contains emerald mines. "Saket is an extensive village, consisting of numerous miners' huts and houses; and independent of its mines, a temple excavated in the rock and some greek inscriptions render it peculiarly interesting to the antiquary. In the adjoining valley, called Wadi Nogrus, which is only separated from Wadi Saket by a ridge of hills, is another village, whose houses are better built and upon a larger scale, with the advantage of a natural reservoir, under the neighbouring cliffs, of excellent water. About 18 miles. "North of Saket is the Jabal Zabára, where is the largest of the emerald mines on the west side of the mountains. The mines are in micaceous schist. At Jabal Zabára is the largest shaft, extending to a distance of about 360 feet and 215 feet in vertical depth. "Saket Bender el Sarkheia is about 48 miles north by west of Saket el Kebir, the road passing on the west of Jabal Zabára and Jabal Rosas. "It is doubtful whether this modern road goes by Saket Bender el Sarkheia, or whether it does not bend north-west from Saket el Kebir and join the ancient road at about Compasi."

3.

BERENICE TO CONTRA APPOLINOPOLIS AND EDFOU.

BY JABAL ZABARA AND EMERALD MINES (ANCIENT ROAD)—DISTANCE ABOUT 115 MILES.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	MURRAY.	SAKET BENDER EL KEBIR. (*Emerald mines.*)	...	...	...	...	... ...	See Routes 1 and 2.
								Between the emerald mines and Contra Appolinopolis are three (ancient) stations. The first presents nothing of interest. Before reaching it several wells are passed, which *once* afforded a supply of water to those who passed. Close to the second station is a temple cut in the rock, founded and dedicated to Amum by King Sethi I, the father of Ramesis the Great. Though small, its sculptures are of very good style. In the hall is a curious tablet of hieroglyphics, bearing the date of the ninth year of this Pharaoh. The temple consists of a portico supported by four columns, and a hall, with four pillars in the centre, at the end of which are three small chambers, or rather niches, each containing three statues. Many visitors have written Greek inscriptions on its walls, most of which are exvotos to Pan; but one is remarkable as being of the soldiers quartered in the

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	MURRAY.							fortified station, whose thirteen names are inscribed on one of the columns of the portico. In a chamber of the station is a block of stone, being an exvoto to Arsine Philadelphi, the wife of Ptolemy Philadelphus, who founded the town of Berenice, to which this road also led from the upper part of the Thebaïd. The third station is small, and presents nothing interesting, except the name of King Amum Toôuk, one of the stranger kings who came to the throne they usurped after the reign of Amemoph III. This road, which leaves the Nile (in going east) nearly opposite Edfou, is, perhaps, the best for a visit to the emerald mines and Berenice, especially as the Ababdi Arabs live there (? at Edfou), who are not to be engaged at Thebes or other places to the north.

4.

COSSEIR TO KENEH ON THE NILE.

BY EL SICCA OR LOWER ROAD—GENERAL BAIRD'S ROUTE.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	GENERAL BAIRD.	COSSEIR ...	...	...	...	...	... ...	General Baird arrived at Cosseir 8th June 1801, and crossed the desert in advance of his army, reaching Keneh 30th June. His force was 7,546 persons, *viz.* :— East India Company's Artillery, &c. ... 448 Ditto ditto Native Troops ... 1,940 King's Troops ... ... 2,838 Officers ... ... 271 Sergeants and Drummers ... ... 456 Lascars, Servants and Followers... ... 1,593 Total ... 7,546 At Cosseir the heat was intense, thermometer 96° and upwards; water bad, causing vomiting, dysentery, and excessive thirst. Along the whole road cannon passed with facility, principally drawn by bullocks brought from India. The losses on the march are not stated. The time occupied was 9 days. The force crossed the desert in detachments. His march from Cosseir to Keneh is thus described — Cossier to new wells ... 11 miles. Water. Half-way to Moilah ... 17 „ No water. Moilah ... ... 17 „ Provisions & water. Advanced wells ... ... 9 „ Water. Half-way to El Egaytah ... 19 „ No water. El Egaytah ... ... 19 „ Provisions & water. Bir Ambeh ... ... 18 „ Water. Keneh ... ... 10 „ Nile. Total ... 120 From Cosseir the road runs somewhat south of west through a valley bounded on the north by hills from 600 to 800 feet high, on the south 300 to 400 feet, running into spurs.
		EL AMBÁJI ...	6	0	6	0	... ...	At El Ambáji springs. Water increases thirst: is offensive to the smell, and purges. Supply abundant, in large pools in the bed of the water-course, amidst reedy grass. Road

Territory.	Authority.	Names of Stages.	DISTANCE.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	GENERAL BAIRD.	EL AMBÁJI—contd.	...	...	6	0	... ...	slightly confined. From Ambáji a road goes north-west to Nukhaili about 4 miles. Here there is camel forage and springs. Water equally good and abundant as at El Baidar. Much water is taken daily on camels to Cosseir. Between the wells of El Baidar and those of Nukhaili there is a fine open plain where an army of 20,000 men might encamp. The wells at Nukhaili are called new wells by Lieutenant-Colonel LeMessurier. He says these desert springs are all more or less dependant on winter rains.
		EL BAIDAR *or* BIR INGLEZE.	6	0	12	0	... ...	El Baidar, the White, so called from the white rocks. At El Baidar are three wells dug by the Indian army in 1801. Water good (? slightly brackish). Would supply 500 to 600 camels and fill again in three or four hours. Water has a slight smell. From 70 to 80 Arab huts here. El Rasafah road diverges here to north-west. A sandy stony plain surrounds the wells, large enough to encamp six or eight regiments. (*Outram.*) The road, on leaving El Baidar, runs south-west for a mile, then west through the pass. It is good and nearly a perfect level until it approaches El Moilah. From El Baidar to entrance of El Dowi, pass valley 1 to 1½ miles in breadth. Pass 3 miles long. Width 100 to 150 yards, in some places 200 yards. At about 4½ miles from El Baidar is the Abu Hubbin valley, 350 to 400 yards wide, with low hillocks on each side. From this place, valley is 250 to 300 yards wide to 13½ miles where it turns more to the south. At 15½ miles the road contracts to 30 and 50 yards for 200 yards. Hills on each side 80 to 100 feet high. At 17 miles a high range (800 feet) begins close to the road north of the valley in which the road lies. At 22½ miles is the summit level between Red Sea and Nile, 1,327 feet above the *river*.— Nearly due north, is a very high range running north and south. At Umi Hummús, 24 miles, a cross road from El Sidh on the El Rasafah road (Route No. 5) comes in. At 27 miles the road winds very much for half a mile. Hills 80 to 100 feet high. At 29 miles is El Bir Laj, where are three wells; two are in use. Supply for 100 camels a day. Water sweet. Bedouins stated that the supply can be increased by digging and clearing. Half a mile east of the wells is room for a wing of a regiment to encamp. At El Bir Laj the pass is 80 to 100 yards wide.
		EL MOILAH ...	30	0	42	0	... ...	Encamping space at El Moilah is very limited, but a regiment may be accommodated close to the wells, and any number of troops at a little distance on the plain before entering the river channel. At El Moilah is one well in centre of pass. Water sweet, but only a

GSL

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	Remarks.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	GRNERAL BAIRD, &c.	El Moilah — contd.	...	...	42	0	... ...	few buckets to be got. At Moilah pass narrows to 25 and 30 yards, closed in by precipitous rocks 200 to 300 feet high. It is winding but level, and could be blocked up with ease by blasting. The road descends very gradually over smooth gravel. Fallen rocks occasionally encroach upon it, but it is always wide enough for guns to pass. The wells at Moilah and El Bir Laj are those called Moilah wells by General Baird. He employed an officer with 100 men for three weeks collecting water in casks at these wells. At Waghit, 2½ miles, the defile is for about 200 yards very defensible. At one spot it closes in to 7 or 8 yards; the rest of the way it varies from 50 to 80 and 100 yards. At 4½ miles it again narrows from 300 yards to 40 and 50 yards.
		Wadi el Gush...	9	4	51	4	... ...	At Wadi El Gush the valley is 100 to 150 yards wide. Here there are three wells, but only one in use; the others are dry. Two of them are substantially built of brick and stone, 30 feet deep, 12 feet broad. Water (in December 1850) 2½ feet deep and 3 feet broad. Supply tolerable, then abundant, but in summer the camelmen have serious quarrels for the water. A man is then appointed by Government to apportion the water. All these wells might be cleared and yield water, but not in any great quantities. Space at the wells for three or four regiments to encamp, and a little before reaching them is an extensive plain. At about 7½ miles the hills, which are here on the south side 500 to 600 feet high, recede from the road, which is thence open and tolerably firm under foot. Sandy in some places. Ground open. No shrubs or vegetation to be seen. Troops may encamp easily along the road the whole way from where the road opens out to the Nile valley.
		El Egaytah ...	30	6	82	2	... ...	Here the El Rasafah road re-joins. From hence various roads diverge to El Redisu, Thebes and other parts of the Nile valley. See routes Nos. 8, 9, and 10. Supplies—fowls, milk, eggs, sheep and goats. Water good and abundant in seven wells, three of which are of masonry, the others dug in the clay. Water within 3 feet of surface and 6 feet deep in the wells. Is never drawn dry, however large the kafilas supplied. There are about 150 huts here of the Ababdi Arabs. The rising ground on which the wells are situated in the midst of a boundless desert affords an excellent position for an entrenched camp Outram says :— " From Cosseir only two roads, practicable for troops, lead westward, and these, after a course of 86 miles, unite at El Egaytah, a position which cannot, therefore, be turned. A small force at this point, supported from Keneh,

CSL

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	Remarks.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	GENL. BAIRD. SIR JAMES OUTRAM, &c.	El Egaytah—contd.	...	...	82	2	... ...	33 miles distant, can close these roads, for, owing to the deficiency of water, only a small force can be brought against it." At El Egaytah are the remains of a brick-built serai, slightly elevated above the surrounding wells, all of which it commands within pistol range. From El Egaytah to Bir Ambeh is barren desert, not affording a blade of vegetation of any sort. Road excellent; firm sand the whole way after leaving the cultivation near Keneh, and level. At 7½ miles, road to Guft, 23 miles from Egaytah, branches off to the westward, leaving Bir Ambeh 3½ to 4 miles to the north. Guft is situated in a most fertile part of the valley; it is within 1¼ mile of the river, with a good road leading to it. At 14¼ miles, a cross road to east called El Derbel Marij, sometimes taken by camel-men. At 21½ pass Koft, the site of ancient Koptos, distant 3 miles to the west. It is an elevated mound of sand, rising out of the cultivation, having several villages near it. Outram considered it would make an admirable defensive position for the advanced guard of an army from India, if an enemy were at Keneh. Stone ruins form material for completing the defences where the fortifications are defective. Lane says :— These ruins consist of mounds of rubbish, ¾ mile by ½ mile, among which are ruined houses, solidly built, but of unburnt brick. There are considerable remains of walls surrounding the town of unburnt brick, 13 feet thick. On reaching Bir Ambeh the road leaves the desert, and turning north enters the cultivated country. Swampy ground on the west at entry to Bir Ambeh.
		Bir Ambeh ...	23	6	106	0	... ...	Bir Ambeh is situated on the border of the cultivation, with low ranges of hills running down to it from a higher range to the north-east, which render it very defensible. Outram says Bir Ambeh possesses great natural strength, and artillery placed on the heights that overlook it would command the whole plain between it and the Nile. The French considered Bir Ambeh impregnable. The road from Bir Ambeh skirts the border of the desert and cultivated lands. For the first 1½ miles out of Bir Ambeh the desert is crossed by parallel ranges of sandhills running at right angles to the road, from which they rise 20 to 30 feet abruptly. They are offshoots from a higher range, running parallel to, and about 2 miles distant from, the road. The spaces between these lower ridges are contracted, varying from 50 to 100 yards; but in some few places they open out to 500 or 600 yards. They are flat on the top, and their sides slope at about 30°. In the immediate vicinity of Bir Ambeh they rise within

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	Remarks.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	SIR JAMES OUTRAM, &c.	BIR AMBEH — contd.	...	...	106	0	... ...	100 yards of the village, running in similar ridges, but are higher and steeper, and the spaces between them are more contracted, They extend in the form of a segment of a circle toward the south, and completely command the road from the desert for 2 or 3 miles, with the plains and all the approaches to north-west and south-west. The higher range prevents the lower spurs being turned. The road runs north-west to Keneh, with the cultivated ground on the west. For the last mile the road is confined to a path between fields, in the midst of which cross a dry canal by a bridge of masonry.
		KENEH ...	11	4	117	4	... ...	Keneh is a town of considerable size, and the emporium of trade between Arabia and Upper Egypt. A large cotton factory, converted into a barrack, holds 4,500 to 5,000 men. The Nile formerly flowed close to the town, but has taken another channel, leaving its old course only a minor one. Landing place for eight months in the year is more than a mile west of the town. The minor channel is not navigable until November. Keneh is 375 miles from Cairo by the main road along left bank of Nile. At Keneh, or in its vicinity, there are generally 6,000 to 7,000 camels in use, or available at any moment; at Thebes, an equal number; and at Essic, about 3,000—all used in the Arabian trade with Upper Egypt. General Baird passed his army from Keneh by divisions in "djerms" (or barges). Ten days were necessary to perform this voyage, the distance being nearly 500 miles (to Cairo ?). The army was encamped on the island of Rhoda until 28th August, when it re-embarked in "djerms" and reached Rosetta on 31st, where it disembarked and encamped at Aboumandour (2 miles south of Rosetta on left bank).

5.

COSSEIR TO KENEH.

BY DERB EL RASAFAH.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	Remarks.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.		EL BAIDAR ...	12	0	12	0	... ...	See route 4. At about 4 miles the road turns to the west. At 8¼ miles a well of good water. Two miles north of road Gehel Baidar hills, 1,000 to

CSL

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.		El Baidar—contd.	...	...	12	0	... ...	1,200 feet. At 10¼ miles bad and brackish water found, 1 or 1½ miles from road at El Murah. At Sáyat-el-Suliman a very good well of masonry. Water good and supply sufficient for 400 or 500 camels. The spring re-fills during the night. Fifteen to twenty Bedouin huts. Road open; 200 to 800 yards wide to about 18 miles; then narrow and confined to Sáyat-el-Suliman.
		Sáyat-el-Suliman *or* Moiyeh-el-Suliman.	13	4	25	4	... ...	Hills bleak, rugged and broken. Loftier ranges to the north 2 to 5 miles distant. To the south they are ¾ to 1½ miles, and vary from 600 to 1,000 feet in height. Intermediate ranges 200 to 400 feet high, with spurs running out from them, which bound the road, and these seldom exceed 50 feet. These contract the road or water-course to 30 and 40 yards in some places; in others it opens to 500 yards. At 14¾ at Reean, the road crosses the watershed between Red Sea and Nile. Road 1,268 feet above the Nile. Here there is a very narrow defile with much broken ground. At one spot the road is confined to a space not 3 yards wide, but the ground could easily be cleared for artillery. The road passes up the water-course, is not steep, but broken and winding for 100 yards. Except for short distances at one or two of the defiles, the road is excellent all the way from Kosei to Sidh.
		El Sidh ...	20	2	45	6	... ...	At 18 miles road branches to join El Sicca road near Umi Hammin. Here is a well of good water, supplies 100 camels daily, but occasionally fails in dry seasons. Defile here very narrow, 10 to 12 yards. This is the key of the road, and might be held against any numbers. Thirty to forty Ababdi huts here. North of El Sidh hills low and broken, 100 feet high, with fragments of granite. To south ground is broken, with loose stones. Would require clearing for artillery. At a short distance from El Sidh commences a narrow and continuous pass which extends to Hammamat. The road is level, following a water-course, and perfectly practicable for artillery. Hills vary from 50 to 500 feet in height. Occasional slight openings to the sides. Average breadth 150 to 200 yards for 5 miles, then narrows to about 80 yards for the rest of the way. Road turns a little to the south at Hammamat.
		Hammamat ...	11	0	56	6	... ...	Hammamat is at outlet of the pass, and has a deep well of brick work, but no water or supplies. Near this well are the quarries of Breccia Verde, from which so many sarcophagi, fonts, and other ornamental objects made of this beautiful stone were cut by the ancients

CSL

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.		HAMMAMAT—contd.	...	...	56	6	... ...	both in Pharaonic and Roman times. The valley of the quarries is called Wadi Foakheer, from the quantity of pottery (Fokhar) found there. It is also remarkable for the number of hieroglyphic inscriptions of very early time on the rocks, for the numerous huts of workmen who lived there, and for the remains of a small Egyptian temple of the time of Ptolemy Energetes. Road for 18 miles shut in by hills varying from 150 to 250 feet high. Those near Hammamat are more lofty. The water-course through which the road passes varies in width from 150 to 400 yards. Road occasionally stony and sometimes sandy. From 18 miles country is open, and the road firm and level. At 23 miles the Derb El Marij turns off to the right leading to Keneh. This road might be used to turn El Egaytah, but from want of water it is seldom travelled.
		EL EGAYTAH .	28	0	84	6	... ...	See Route No. 4, El Egaytah to Keneh, 35¼ miles.

NOTE.—Sir G. Wilkinson (Murray) says—"The most interesting road (from Cosseir to the Nile) is the Derb El Rasafah from the ancient Roman stations met with at intervals, and from its having been the old road from Koptos to Philoteras Portus. There are eight of these stations on Hydrenmas, some of which are distant from each other 5 or 6, others from 8 to 12 miles, besides the wells of Egaytah, which were also known to the ancients. The first station (from the Nile), whose site and plan are less easily traced than the others, was distant from Koptos only 9 miles, and was probably common to the Philoteras Portus and Berenice roads."

6.

COSSEIR TO EL REDISIYE.

BY THE DESERT.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	COL. LEMESSURIER.	FARFAWI ...	64	0	64	0	... ...	Water good.
		EL DUGINA ...	80	0	144	0	... ...	Two wells of very tolerable water. Supply said to be enough for 200 or 300 camels.
		ABAD ...	64	0	208	0	... ...	One well of sweet water. Enough for 100 camels.
		EL REDISIYE ...	16	0	224	0	... ...	El Redisiye is on right bank of Nile, 5 miles above Edfoo.

This road is described as generally good for camels. It is frequently travelled, but the route by El Egaytah is preferred. (See Route No. 10.)

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	Remarks.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	COL. LE MESSURIER	The distances are given by Lieutenant-Colonel LeMessurier in day's journey of camels, and are reduced to miles, assuming that a laden camel can travel 32 miles a day. But it must be noted that the total distance as given on various maps is only about 120 miles as the crow flies. A camel can work without water for three days in winter and two and a half in summer without any great inconvenience.						

7.

COSSEIR to CAIRO.

BY THE CONVENTS AND BENESOUF.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	Remarks.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.		Convent of St. Paul, *or* Dayr Bolos.	240	0	240	0	... ...	The Convent of St. Paul appears to be identical with or very near Zafarana, which is eight and a half days from Cosseir (Route 22). It is situated 9 miles from the Red Sea, and has a garden. The road is along the Wadi-el-Araba, a large valley nearly 20 miles wide between the ranges of north and south Kallala.
		Convent of St. Anthony, *or* Dayr Antonios.	14	0	254	0	... ...	The monastery of St. Anthony is inhabited by Kopts, who are supported by voluntary contributions of their brethren in Egypt. This is the principal monastery in Egypt, though Dayr Bolos claims an equal rank. Garden kept in very good order, an agreeable retreat after crossing the desert. Monks are hospitable, and the convent is famed for its olives. The convent stands below the Kallala mountains, which bound the Wadi-el-Araba to the south. The convent is 17 or 18 miles from the sea. Road along the Wadi-el-Araba, in which are several watering places. The most convenient are at Wadi-el-Areideh on north, and at Wadi-om-Aineheh on south side. This desert belongs to the Maazi tribe of Arabs, whose camels may be engaged at Dayr Bayád, South of this road, in Wadi-om-Argáb, a valley running into Wadi Moäthil, which again falls into the Wadi Sanur, are quarries of oriental alabaster, from which stone has been taken to ornament the mosque of the citadel (at Cairo ?). There is also a gypsum quarry near Gebel Khalil on north side of Wadi Araba. Wansleh speaks of a ruined town in same neighbourhood. Mountains in this part of the desert are all of limestone. After leaving the Wadi-el-Araba road crosses several torrent beds before reaching Dayr Bayád, opposite Benesouf.
		Benesouf ...	76	4	330	4	... ...	See Routes 24, 25.
		Cairo (*by water*)	73	0	403	4	... ...	

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8.

EL EGAYTAH TO GUFT.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	LIEUT.-COL. LeMESSURIER.	GUFT ...	27	0	...	...	... ...	This road is the same as Route No. 4 for 7½ miles beyond El Egaytah, whence it proceeds direct to Guft, leaving Bir Ambeh 3½ to 4 miles to the north. This road affords the means of turning the strong position of Bir Ambe h. As it approaches the cultivated lands, however, it is commanded by low ranges which run east and west, and form a shallow valley about 1¼ mile broad, through which the road passes; these heights on the north are of the same description as those at Bir Ambeh, and in continuation of them, but lower; were these heights held by an enemy, the road would be placed between two fires. There is a road intermediate between this and Route No. 4, by which the strong ground may be avoided, but it is practicable only from December to July; August to November, the country from Bir Ambeh to Guft is under water.

9.

EL EGAYTAH TO LUXOR AND THEBES.

BY HEJAZE.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.								At about 24 miles the cultivated land is reached, after descending a gorge (see Linant's map) near the village of Hejaze.
		HEJAZE ...	25	0	...	...	... ...	Hejaze to Luxor the road is in the cultivated country.
		LUXOR *about*	18	0			... ...	
			—	—	33	0		

GSL

10.

EL EGAYTAH TO EL REDISIYE.

BY THE DESERT.

Territory.	Authority.	Names of Stages.	Distance. Stage. Miles.	Distance. Stage. Fur.	Distance. Total. Miles.	Distance. Total. Fur.	Rivers.	REMARKS.
EGYPT.	LIEUT.-COL. LeMESSURIER.	TUNAYTIB ...	One day's journey for camels					At Tunaytib a very little water, enough for 10 or 15 camels.
		ABAD ...	One and half ditto ...					One well of sweet water, enough for 100 camels. Here route No. 6 goes off to the east to Cosseir.
		EL REDISIYE ...	Half a day's ditto ...					

This road is described as being undulating and sandy, and in some places crossing over small ranges of hills; but camels laden with corn and other hill produce constantly travel over it. The intercourse between El Redisiye and Cosseir by this route is great at all seasons, vast numbers of camels laden with grain travelling constantly to Cosseir. From description the road would appear perfectly practicable for artillery.

Lieutenant-Colonel LeMessurier says:—"In a military point of view this line is important as connected with Cosseir and the communications with the eastern desert and the Nile. It is observed by Denon when the French were in pursuit of the Mamelukes in 1798 that Desaix took up a position at Bir Ambeh and also at Negadi (or Hejaze on the road leading to Thebes), but Redisi (El Redisiye) was imprudently neglected. If the strait of Redisi could have been occupied, all the Beys on the right bank of the river would have been forced to surrender."

11.

HAMMAMAT TO KENEH.

BY DERB EL MORIJ.

Territory.	Authority.	Names of Stages.	Distance. Stage. Miles.	Distance. Stage. Fur.	Distance. Total. Miles.	Distance. Total. Fur.	Rivers.	REMARKS.
EGYPT.								

See Route 5.

This road leaves route 5 at 23 miles from Hammamat and 5 from El Egaytah, turning off to the right (north). Apparently it passes on the north side of hills north of El Egaytah. It joins Route 4 14½ miles from Bir Ambeh or 9½ short of Keneh.

This road is according to Lieutenant-Colonel LeMessurier sometimes taken by camel-men.

GSL

12.

ABU SHAAR (MYOS HORMOS) ON RED SEA TO KENEH ON THE NILE.

BY THE DESERT.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	MURRAY'S HAND-BOOK. KEITH JOHNSTON.	Abu Shaar or Myos Hormos.	...	...	...	...	... ...	Myos Hormos was the principal port on the Red Sea in the time of Strabo. Its ruins lie on the coast in lat. 27°24′. The town is small, very regularly built, surrounded by a ditch and defended by round towers at the corners, the faces, and the gateways. The port, which lies to the northward, is nearly filled with sand. Below the hills to the east is the Fous Tadmos mentioned by Pliny. At about 18 miles cross route No. 22: road runs due west passing through a range of mountains at about 20 to 30 miles.
		Moie-b-el-Abd	40	0	...		... ...	From Moie-b-el-Abd., the Jabal Dokhan, or Myos Porphyrites (K. J.) The quarries here supplied Rome with stone for columns and many ornamental purposes. The remains consist of an Ionic temple of the time of Trajan left unfinished, a town irregularly built of rough stones; tanks, and two large wells, one cut in the porphyry rock. There are also ruins of buildings in various parts of the mountains. Murrays says the road between Jabal Dokhan and the Nile is furnished with fortified stations at intervals, to protect those who passed, and to supply them with water from the large wells within their walls, but these probably do not exist now.
		Moie-el-Akseir	22	0	62	0	... ...	No information. Names are from Keith Johnston's atlas, map No. 39, from which also the distances are taken.
		Dayr (Convent).	5	0	67	0	... ...	
		Saghi ...	18	0	85	0	... ...	
		Old Keneh Station.	12	0	97	0	... ...	
		Keneh ...	32	0	129	0	... ...	

13.

SUEZ TO CAIRO.

BY DERB EL HAMRA (THE OLD INDIAN TRANSIT ROUTE) *or* DERB EL HAJ.

By this road the Indian mails used to be taken across the Isthmus. It is the great pilgrim road from Cairo to Mekka. It has been cleared and partly macadamised; it is an excellent carriage road. There are 15 station houses and 17 telegraph stations on it. But no water is found. Distance, Suez to Cairo, 84¾ miles.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	LIEUT.-COL. LeMESSURIER.	SUEZ ...	...	...	...	..	... ...	Road leaves Suez by Western or Cairo Gate running north-west. Pass the mounds of the ancient Clysma, 500 yards to the north. At ½ mile cross a large water-course from the west, which flows into the bay about ¾ mile to south.
		BIR-EL-SUEZ ...	2	4	2	4	... ...	Wells of Bir-el-Suez very deep, and supplied by springs which are inexhaustible, but the water is very brackish. The poorer classes of the inhabitants of Suez use this water, but the richer procure their drinking water from the Well of Moses, 10 or 11 miles from Suez on eastern side of the bay. There is a reservoir, which is filled for camels at these wells. They are enclosed in a stone building. The road from Suez to the wells is sandy first, then firm. At 3½ miles pass No. 15 station house and telegraph on the left, close to the road. Road stony in some parts, but level to north. Country open and unbroken.
		FORT OF AJRUD..	10	0	12	4	... ...	On approaching the Fort (at 800 yards) pass station No. 14 on left. Road slightly stony; low ridges south of station. Fort is situated on slightly rising ground. It is quadrangular, stone built, 50 to 60 yards square, with small towers at the angles. At its south-east angle is a telegraph tower. Gateway is on south side. A large water-course from the hills to west and north runs on its north side, and some low ridges mark the termination of the hills in that direction, which are several miles distant. The Derb el Haj (Route No. 17) branches off on north side of fort, going east towards Mekka and west to Cairo. Two hundred yards west of fort are some wells. Water brackish, but better than that at Bir-el-Suez. Wells in use said to be about 300 feet deep. Supply abundant. The horses of the station house No. 14 (used to ?) drink of those wells, as also the 150 or 200 inhabitants of Ajrud. A large reservoir is constantly kept supplied from the wells for the use of camels of pilgrims and others proceeding to Mekka. The wells are enclosed by a stone wall. This is one of the principal halting grounds of the pilgrims.

GSL

Territory.	Authority.	Names of Stages.	Distance. Stage. Miles.	Distance. Stage. Fur.	Distance. Total. Miles.	Distance. Total. Fur.	Rivers.	REMARKS.
EGYPT.	LIEUT.-COL. LeMESSURIER.	FORT OF AJRUD —contd.	...	...	12	4	... ...	At 2¼ miles from Ajrud cross a large water-course, which is again crossed at 3½ miles, where hillocks skirt road to south. At 4½ miles road winds between low ridge and broken ground, and is much shut in. This defile was formerly very celebrated for robberies. The ground here, and north and south for some distance, is well adapted for such acts, and light troops could be advantageously posted here to oppose a force advancing from Suez or from the west from Cairo. From last stage the high range of the Jabal Ataka mountain is seen running parallel to the road from 8 to 10 miles distant, and lower ranges run out in a direction generally north-east. Low spurs and ridges from these approach the road, varying from 20 to 60 feet high.
		EL MUKTALA ... (*No. 13 Station-house*).	6	4	19	0	... ...	No. 13 station-house lies south of the road. South of it the low hills, from 20 to 40 feet high, close in on the road; and long low ridges approach the road on north side also. From El Muktala road turns west, and gradually ascends for 6½ miles to No. 12 station-house, when the ground to south is much broken and cut up. On north the offshoots from Jabal Awabit gradually subside into long low ridges. From No. 12 road still ascends 3½ miles to telegraph station El Misriffe. It is cleared and well defined all the way from No. 13 station, but the ground on both sides is uneven, and in some places slightly broken. The ground on which the telegraph is situated is the highest between Cairo and Suez, the water flowing east and west from it. At the telegraph a road called Derb-el-Kutti branches off to the right, and rejoins at No. 10 station. Here also the Derb-el-Tarabin (Route 15) goes off to the left or south-west. The main road bears to west by north, and enters the plains of El Maggra. Jabal Ataka distant about 7 miles south. Jabal Awabit on the north runs parallel to the road for about 9 miles.
		EL MAGGRA ...	11	0	30	0	... ...	No. 11 station-house is passed at ¾ mile; it is called El Rúzúm. At 6⅝ pass No. 10 station, or Rúzúm El Súgir. Two hundred yards south of No. 10 an ancient reservoir for collecting rain-water was discovered in 1848, the dimensions of which are about 65 feet by 45 feet and 15 feet deep. It was cleared out. It is situated at a point where several water-courses unite, and would fill after heavy rain. It is apparently a Roman work. At 11⅜ miles pass No. 9 station. About a mile west of this is a small Sheik's tomb called Kobbet El Takuri. About 300 yards south of No. 9 a well was dug for water several years ago, but without success. At about 13 miles is a very large acacia tree called Oomi Sharanet, or the mother of old rags, from the quantity of dirty bits of old

Territory.	Authority.	Names of Stages.	Distance. Stage. Miles.	Distance. Stage. Fur.	Distance. Total. Miles.	Distance. Total. Fur.	Rivers.	REMARKS.
EGYPT.	LIEUT.-COL. LEMESSURIER.	EL MAGGRA—contd.	...	...	30	0	... ...	rags which the pilgrims to Mekka annually attached to its branches.
		WADI JANDALI (*No. 8 Station-house*).	16	1	46	1	... ...	No. 8 station is on the east side of Wadi Jandali, a valley which coming from a direction about south-west here crosses the road and runs north-west in a nearly straight course to Belbeis and the Nile and carries (according to M. Linant) off the drainage of all the ravines west of the watershed above mentioned. On Linant's map this station is called "Grande station Dar El Amra anjourdhui Dar El Beïda." Lieutenant-Colonel LeMessurier says "about 1½ miles north of No. 8 station the Pasha has recently built a desert palace." On M. Linant's map, however, the palace is marked Dar El Beida Palais du Vice Roi at a point on the high ridge north of the road no less than 8 miles north-west of No. 8 or Grande station. At about 6 miles the road passes No. 7 station; at 10⅜ miles No. 6 station. Up to this point the desert is perfectly open; the road excellent throughout from No. 12, though slightly sandy near No. 10. From this point the country is no longer open. Low hills skirt the road both north and south. From the south, long ridges varying in elevation from 150 to 400 feet, run in a general direction north-west. At 13⅜ miles a road to Birket el Haj goes off to north-west. Just before reaching this the road passes between two high ridges, and No. 5 telegraph was hence called El Booyeh, or the Doors. No. 5 station is at 15 6/8 miles, and the road near it is sandy. At 20⅝ miles pass No. 4 station, containing a dining room and three bed rooms with a telegraph 300 yards north. At 26 miles pass Wadi Halazoni, or "valley of snails," so-called from snails abounding here, as indeed they do throughout this part of the desert. About Wadi Halazoni is much petrified wood. Here is also No. 3 station. At 29, reach (site of) No. 2 station. Country continues the same. The spurs and offshoots gradually subside as they pass to north-west, where they are lost in the large range of shifting sandhills. From No. 2 station to Cairo the road is generally macadamised; the spurs to the south decline in height, and the country to the north becomes more open. Various footpaths lead over the plains towards "the red hill and to Cairo."
		CAIRO ...	38	1	84	2	... ...	At 35 miles road inclines south, passes the Pasha's palace called El Hasswah, passing northern face of city, enters Cairo by the Bab-El Hadíd (or the iron gate), situated at its north-west angle.

CSL

14.

SUEZ TO CAIRO.

BY OLD INDIAN TRANSIT ROUTE.*

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	Remarks.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	CAPTAIN GELL—ROUTE OF 10TH HUSSARS—1855.	SUEZ ... (*1st Camp*).	...	..	...	..	... ...	Suez, a walled town with bastions. Walls 18 feet high in 1854, but useless against field artillery, as they are exposed to their foot. On the western side are remains of field fortifications connected with the walls; these were ruinous in 1854. Suez contained then 4,000 inhabitants and 40 shops. Water-supply at that time from Bir El Suez (see Route 13), from fountains of Ghirkudeh to the north-east about 9 miles. They are mere holes, 10 feet deep, containing 3 or 4 feet of water of peculiar taste, but not brackish. Shipping was supplied from the Der wells on the African coast, about 30 miles from Suez. Supply limited, but water good. The water supply for the cavalry, which marched through in 1855, gave great anxiety (see Captain Gell's reports). In consequence of the difficulty in procuring water at Suez itself, the first camping ground was selected at the Suez well, 3 miles from the town. Eighteen thousand gallons of Nile water were deposited in reservoir of this well. Encamping ground 600 yards on Suez side, and 100 yards south of road, unlimited in extent, and good holding ground. Road to this spot from Suez unmade. A few sandy dips, but the greater part firm and good for all arms.
		STATION NO. 15	6	0	6	0	... ...	The road pursues a north-west direction to station No. 15, where there is stabling for 40 horses and four store-rooms. These stables are precisely the same in every station from Suez to Cairo. At each station two and in some three iron tanks holding 750 gallons each. Around station 15 the encamping ground is good, unlimited in extent, and good holding ground for pickets. The road is good the whole way to station 14.
		STATION NO. 14	6	0	12	0	... ...	Tanks and stabling as at No. 15. Half a mile to the north of this station is Fort Ajrud, near which a brackish well, 300 feet deep, enclosed in a quadrangle with two towers. Fort Ajrud is square, with sides of 80 yards, with towers at the angles; walls 24 feet high, of cut stone. Has a gate with no flank defence. Outside the enclosure of the well a reservoir 33 feet by 51 feet and 7 feet deep. Well

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* See also Route No. 13.

CSL

Territory.	Authority.	Names of Stages.	Distance.				Rivers	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	CAPTAIN GELL—ROUTE OF 10TH HUSSARS—1855.	STATION No. 14—contd.	6	0	12	0	... ...	worked by a Persian wheel. Its water purges horses, but is used by pilgrims. Station No. 14 commanded by a hill 100 paces to the south, with a relief of 50 feet. The road from this station to the next is good, winds a little, and is undulating, commanded by hills on both sides.
		STATION No. 13	6	0	18	0	... ...	Tanks and stabling as at No. 14. Good and unlimited encamping ground, but the best spot is to the north and beyond a dry nala. The road stony, but fit for all arms.
		STATION No. 12 (*2nd Camp*).	6	0	24	0	... ...	At this station, in addition to the usual stable, is a rest-house containing six bed-rooms and one large room, 30 feet by 12, also kitchens, &c. In addition to the iron tanks is a reservoir covered over and having entrance by a trap-door. It is 18 feet by 9 feet and 8 feet deep, in good condition. The road to No. 11 station ascends for 2 miles. In some places it is heavy for infantry.
		STATION No. 11	5	0	29	0	... ...	At No. 11 is the usual stable and two iron tanks.
		STATION No. 10	5	0	34	0	... ...	Here there is the usual stabling and tanks. The best encamping ground is opposite the stables and across the road. Here there are five iron tanks in good order. About 1 mile from this station are Roman reservoirs in bad order.
		STATION No. 9 ...	5	0	39	0	... ...	Has stabling, good encamping ground, good holding ground for pickets, and the road is good to No. 8.
		STATION No. 8 ... (*3rd Camp*).	5	0	44	0	... ...	Here, besides stabling, &c., there is a rest-house of 2 stories. Below, one large room 40 feet by 20; kitchens and other rooms. There are eight bed-rooms and a sitting-room. In the enclosed yard is a reservoir similar in size to that at No. 12. Good encamping ground all round unlimited in extent, and opposite the station 2 miles distant is Abbas Pacha's desert palace, with a reservoir capable of holding 1,00,000 gallons.
		STATION No. 7 ..	6	0	50	0	... ...	Here there is stabling, good encamping ground, and two iron tanks.
		STATION No. 6 ...	5	0	55	0	... ...	Similar to No. 7. Encamping ground to north-east of road and across it. Road good but undulating to No. 5.
		STATION No. 5 ..	5	0	60	0	... ...	The same as the other small stations. Encamping ground to the south of the road.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	CAPTAIN GELL—ROUTE OF 10TH HUSSARS—1855.	STATION NO 4... (*4th Camp*).	5	0	65	0	... ...	Here a rest-house similar to No. 12. Encamping ground 200 yards on Cairo side, north of the road.
		STATIONS NOS. 3, 2, AND 1.	...	...	...	...	... ...	Exactly similar in all respects to the former. Small stations with encamping ground all round.
		CAIRO ...	17	0	82	0	... ...	Spot selected for camp on what is called the Artillery lines south of the Cairo and Suez road, unlimited in extent and firm, with a well on either flank worked by a Persian wheel. The spot is ½ mile from the Suez gate of Cairo. The barracks placed at the disposal of 10th Hussars in Cairo were the artillery barrack, capable of holding 450 men and horses, and the cavalry barrack 400 men and horses; they were fine buildings of stone. The 10th Hussars and 12th Lancers appear to have marched to Cairo by the foregoing route with great ease. *Note.*—The construction of the sweet-water canal has now supplied Suez with water; but as it and the railway both run to Cairo *viâ* Ismailia, it is probable that the water supply along the foregoing route would still be a source of anxiety.

15.

SUEZ TO CAIRO.

BY DERB EL TARABIN.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	LIEUT.-COLONEL LEMESSURIER.	BIN EL SUEZ ...	2	4	2	4	... ...	See Route No. 13.
		FORT OF AJRUD	10	0	12	4	... ...	
		EL MUKTALA ... (*No. 13 Station-house*).	6	4	19	0	... ..	
		EL MISRIFFE ...	9	5	28	5	... ...	At El Misriffe, 9⅝ miles from El Muktala (or 28⅝ from Suez), leave route No. 13 in a direction west-south-west, and pass over the eastern and southern portions of the plain of Maggra, a fine open level country with a firm gravelly soil. At 4 miles from El Misriffe a branch road to south-east between openings of Muggret Wubbereh hills runs to join Wadi Ramliye

GSL

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	Remarks.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	LIEUTENANT-COLONEL LEMESSURIER.	EL MISRIFFE—contd.	...	...	28	5	... ...	route (No. 16) near well of Guebbe. At 6 miles another branch road runs to west of Guebbe. This one is called Derb El Abu Shah. Both of these cross the great valley south of Jabal Ataka. At 13 miles a third branch road passes to east, up the valley called Wadi-mu-i-Mushaylee formed by the Essaylee and Maldar hills. This is a very indifferent cross road; it joins (route No. 16) at Ras El Wadi Ramliye, and passes south to Wadi Jullalah. At about 18½ miles the hills on either side approach each other, and the open ground ceases; on east and south the hills are lofty; on west and north they run into broken and low ranges.
		WADI JANDALI	22	0	50	5	... ...	At 22 miles enter Wadi Jandali. The entrance from north-north-east is marked by a conspicuous small black hill, which is seen from a great distance. About 7 miles from this hill south there is an excellent well of water at the head of the Wadi Jandali called Bin El Jandali. This is one of the wells alluded to in the description of the Wadi Ramliye route (No. 16); the road to it is good. *Note.*—This description does not agree with M. Linant's map. It makes the distance from El Misriffe to Wadi Jandali 31 miles, and the Pint de Jandali only 3 miles south of road.
		JUNCTION WITH ROUTE NO. 16. WADI RAMLIYE	13	3	64	0	... ...	Road runs 1¼ mile south-south-west, then turns west by north, and passes between low and undulating ridges for 10 or 11 miles, and joins Wadi Ramliye (route No. 16) at 13⅜ miles.
		CAIRO ...	20	4	84	4	... ...	From junction to Cairo, see route No. 16.

16.

SUEZ TO CAIRO.

BY WADI RAMLIYE.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	Remarks.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.		This is the southernmost road (except No. 19), and passes round the south extremity of Jabal Ataka. It is a good road, and there are four wells of water on it. By disembarking troops near the well of Guebbe, instead of at Suez, the distance to Cairo is reduced to 74 miles, making it 10 miles less than route No. 13, and 14 less than No. 15.						
		SUEZ ...						Leave Suez by western gate. General direction west for 2½ miles, then gradually inclines to south, following the trending of the bay.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	Remarks.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	LIEUTENANT-COLONEL LeMESSURIER.	SUEZ—contd. ...	...	...	...	..	... ...	Road occasionally sandy, but after first 4 miles stony, passing over loose stones washed down from the Ataka mountains. The Ataka mountains rise about 3,000 feet above the sea. The highest point is about 12 miles in a direct line due west of Suez, from which they gradually decline towards the south. At 27 miles *by road* they subside into low ridges, round which the road passes to Cairo. At 3½ miles pass some embankments made across some large water-courses to collect the rain. They are about ¾ mile to north-west, and are said to contain occasionally a month's supply of water for Suez. From this point the ground rises very considerably to the base of the mountains, and the intermediate space, 7 to 8 miles, is much cut up by deep water-courses, which are deeper nearer the mountains. Large stones and boulders cover the surface of the ground. In these water-courses a little camel forage is found.
		TEN MILES FROM SUEZ (*No name given*).	10	0	10	0	... ...	Encamping ground close to the sea. After heavy rain is much liable to be flooded. Road follows sea shore more or less for 4½ or 5 miles, then passes over a tongue of land, and at 8 miles comes again to the beach.
		BIR EL GUEBBE	13	0	23	0	... ...	Bir el Guebbe, 5 feet long, 3 feet broad, 1½ feet deep. Water slightly brackish, supply limited, but improved by drawing. Here Colonel LeMessurier proposes to disembark troops coming from Aden to march on Cairo. Distance 77 miles. (See page 360 of Outram's and LeMessurier's reports.) At 3½ miles road turns to north-west, and passes round southern extremity of the Ataka range of mountains (here running in broken ridges and undulations), and proceeds over a generally level tract. At 4 miles cross the drainage line from southern slopes of the Ataka range to the sea. Near this, Route No. 19 branches south and west to Atfieh on the Nile, and No. 22 comes in from south. Another road passes through the valley on the south side of Ataka mountains, and enters the plain west of them joining Route No. 13 near No. 10 station. From 4 miles the country to right or north presents a valley, in which the lower ranges and offshoots of the Ataka mountains lose themselves in broken and confused ridges cut up by deep water-courses. To the south the ground is undulating with small detached hills, and covered with loose pebbles.
		WADI BAIDAR ..	8	0	31	0	... ...	The Wadi Baidar is an open space with numerous shallow water-courses passing through it; the ground is undulating and covered with abundance of camel forage. In the immediate neighbourhood of this spot a beautiful description of pure crystallised salt is found. The ground is limestone (?) of a

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	LIEUTENANT-COLONEL LeMESSURIER.	Wadi Baidar—contd.	...	...	31	0	... ...	dazzling whiteness, and on digging a few inches masses of this salt are seen intermixed with it. Abundance is found in this part of the country. It is an article of trade in a small way among the Arabs. Road from last camp generally good and level; in some parts stony and broken, but quite practicable for artillery. Encamping ground open. No water, but one mile south of the road there is an excellent well called Bir el Baidar; it is partly built. This well is liable to fail after a long drought, and in early December, before the fall of the winter rains, it becomes very low. In dry seasons it is nearly dry during October and November. In January 1850 it was 4 feet wide and 18 inches deep. In a geological point of view this Wadi Baidar deserves especial notice, as well as the country to the westward to within 5 or 6 miles of the Nile. The right bank of the water-course is high, and both east and west, for several hundred yards, is almost entirely composed of preserved (not petrified) oyster shells. They are very large and flat, and lie in layers varying from 2½ to 3½ feet thick, closely packed one upon the other, intermixed with a very light variety of yellow limestone petrifactions with small pieces of petrified wood of the same description as is so commonly found in the petrified forest near Cairo. The Egyptian pebble is also common in this valley. On leaving Wadi Baidar, road passes 5 miles over gentle undulations covered with pebbles. A small range of hills called Teb-el Baidar (distance 2½ to 3 miles), runs parallel to the road. At about 12½ miles enter Wadi Ramliye after passing over a very stony country cut up by water-courses. These water-courses are, however, not deep; the line of road is generally in the beds of water-courses running east. On approaching the Wadi Ramliye, the hills on north-west and south gradually approach each other and form an amphitheatre, from the centre of which a large water-course issues. This is the Wadi Ramliye. Lieutenant-Colonel LeMessurier says it is in its character the most formidable pass he ever saw. He compares it to a part of the Bolan pass called the Zig-zags. It is 11,236 yards (6 miles, 676 yards) in length, and is very winding. The hills on either side through which this remarkable water-course has cut its way vary from 100 to 150 feet in height; those on the left bank are precipitous and accessible only in a few places. Their tops are level and terrace-like, cut up at intervals by the deep water-lines which flow from the ranges above, the surface being covered with loose fragments of stone. The right bank is of the same character, differing only in parts where they are more accessible than on the left. The general direction of the pass is west-north-

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	Remarks.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	LIEUTENANT-COLONEL LeMESSURIER.	WADI BAIDAR—contd.	...	...	31	0	... ...	west. After heavy rain the torrent rushes down with fury, carrying destruction to all within its influence; such is its force that horses, mules, and camels are sometimes swept away, especially at the lower end, where, for a length of 4,000 yards, the breadth is from 40 to 80 paces only. The water is described as rising 3, 4, and even 5 feet in the pass after heavy rain. The approach from the east is open, and it is not difficult to crown the lower range, plateau, or terrace which immediately bounds the pass; consequently infantry could act without difficulty. At about 14¾ miles the pass gradually opens. The hills recede and run into slopes and low spurs; but the pass itself is still commanded on all sides throughout its entire length. The bed of the water-course is level and of smooth sand, yielding but little to a camel. A gun-carriage would not sink above an inch and a half. This pass would present a rich field for a geologist. The whole surface of the hills presents a remarkable aspect. The hills are of limestone, the usual formation of this desert, rugged and broken into every form and shape, each fragment being corroded as if burnt out by the action of fire, leaving a thin coating on the surface, which when struck gives a strong metallic sound, and in some instances gives way to the pressure of the foot. The same appearance exists on the range to the north of the Ataka mountains, but not elsewhere in this desert.
		WADI RAMLIYE (*Camping ground*).	18	0	48	0	... ...	Camping ground exists in the pass. Its position, however, is not described. From description it would appear to be near the western outlet. It should not be used during winter. There is no water or forage. On leaving encamping ground road winds for about a mile, when it leaves the pass and crosses the water-shed dividing Wadi Ramliye from Wadi Kayatiyat. This point is called Ras-el-Wadi Ramliye. Here a road comes in from the Tarabin road on the north, and passes south into the valley of the Abu Daraj Mountains. The main road thus crosses a water-course running south, and takes a general direction north-west. The country gradually becomes more open, and the hills recede to north and south. Those north are called Jabal Maldar; those to south Jabal Kayatiyat. They are 3 to 5 miles apart, and the valley between them is the Wadi Kayatiyat. The Jabal Essaylee range runs north from the Wadi Ramliye. The road in the Wadi is rather broken and stony.
		WADI RAIBOON..	8	4	56	4	... ...	At 8½ miles the road leaves west Kayatiyat, and enters Wadi Raiboon, and inclining south a little, passes down a sloping ridge which is stony but not difficult. General direction

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	LIEUTENANT-COLONEL LeMESSURIER.	WADI RAIBOON —contd.	...	...	56	4	... ...	north-west is preserved. Waters flow south-east. Wadi Raiboon is of some extent, varying from 10 to 15 miles north and south, the general direction of hills being north-west and south-east. The whole of the valley of Raiboon is remarkable for its fossils and petrifactions; and so singularly do they abound, especially at the eastern end of it, that the ground is *literally* composed of shells and nummulites, with minutely broken particles of petrified wood,—so much so, that it is scarcely possible to discover a pebble. Oyster shells cover acres of ground lying in masses thrown confusedly together. Low range of hills bounding Wadi Raiboon on south is called Sidi-Nai-Meh. Beyond it is a much higher range called Jabal Mehjamah. This latter is lofty. To the north the range is Jabal Maldar as above. The road is generally good and level. From about 5 miles the country on the right is much cut up by water-courses.
		JABAL RAIBOON..	10	4	67	0	... ...	At 10½ miles road passes Jabal Raiboon. It is a peculiar conical hill of no size (about 100 feet high); it is conspicuous from its form and colour, which is quite black and covered with large blocks and masses of stone. Porphyry is found here in small quantities, and in the mountains to south also. Camping ground open and extensive enough for 10,000 men. Some camel forage, but no water found here. On leaving Raiboon the road passes over a fine open plain bounded by hills. At 5 miles it crosses the water-shed between Red Sea and the hill, and enters the Wadi Jandali. At 5½ miles are two good wells of water called Mai-ut-Jandali or Bir-ut-Jandali. They are in the head of the large water-course which flows hence to the north called the Wadi Jandali. The water of these wells is partly from a spring and partly from rain. They are stone built, and taken much care of by the Bedouins, who pasture their flocks over this part of the desert. The supply is good, and is seldom exhausted; it is perfectly sweet. These wells ars liable to partially fail in November and December after a long drought. The first well is 300 yards off the road to north-west, the other 600 yards further. From the wells a good road goes down the Wadi Jandali north to Derb-el-Tarabin (Route No. 15), about 6 miles north. Also roads to Helwan and to Shorafeh, 15 miles south of Toora (see Route 20). At 10 miles pass a remarkable isolated hill called Yah Moom (? Jabal Amoun on M. Linant's map). The road from the wells passes over a fine open desert country, generally firm and hard, running in long undulations with a general direction north-west. At 10 miles turn to

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYYPT.	LIEUTENANT-COLONEL LeMESSURIER.	JABAL RAIBOON —contd.	...	...	67	0		west by north, skirting a long range of hills to right (north), and at 14 miles join Derb-el-Tarabin road (Route No. 15).
		JUNCTION WITH DERB-EL-TARABIN ROAD. (*Route 15*).	14	0	81	0	... ...	Road follows a small valley running nearly due west. The Wadi Dejti runs parallel about 3½ or 4 miles to south; its waters flow into the Nile north of the Tora quarries. At 6 miles from junction of roads the road passes over the great petrified forest. It is situated on the southern slopes of a range of low hills (which are offshoots from the Mokattim hills above Cairo), and covers many acres. In some parts the petrifactions are found collected together, in others in single trees, but generally they are seen three or four close together confusedly lying over one another like felled timber. The petrified trees are of various sizes, none very small. One of the largest Colonel LeMessurier found to be "39 yards" (117 feet) long and 5½ feet in diameter at 6 feet from its root. The trees are, however, seldom found entire, but broken, and various corresponding pieces lying close together. To the south the ground is much broken up into low sand-hills, and is prolific in fossils and petrifactions. On leaving the petrified forest the road proceeds in a general direction west, and at 7½ miles enters the bed of a large water-course called Bahar-be-la Mai (or the river without water); the ground is level and generally firm. On either side (broken and cut up by numerous minor water-courses) are sand-hills of 100 and 150 feet high. To south are higher ranges of hills 700 feet high and 1½ to 2½ miles distant; on north the ground rises in swelling ridges, which form the eastern terminations of the Mokattim hills. Between these and the higher points of the Mokattim range, which overhang Cairo, is a nearly level table-land. At 10 miles leave the Bahar-be-la-Mai, and at 11pass a shaft which was sunk "a few years ago", *i. e.*, before 1850, in a fruitless search for coal.
		CAIRO ... (*By direct road*).	20	4	101	4	... ...	From this point the direct road runs north-west to Cairo, passing close to south of the Red Hill, and enters Cairo at the east by the Bab-el-Nesir, and another branch runs west and continues in the Bahar-be-la-Mai to 14 miles. Then inclines north-west, passing over open ground to the village of Bazatin, 17½ miles. The offshoots from the Mokattim hills skirt the road on east and north-east as far as this village. From Bazatin the road turns northwards towards the city. It passes between the Nile and the precipitous western face of the Mokattim hills, which rise 300 to 500 feet above the road at a distance from the river of

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Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	LIEUT.-COLONEL LeMESSURIER—SIR JAMES OUTRAM—MR. LIEDER—LIEUT. CONSTABLE.	CAIRO – contd.	...	...	101	4	... ...	3¼ to 3½ miles. The whole of this range completely commands the road. West of the road are the mounds and debris of the ancient city. Taking this road the city is entered by the Karemaidar and Ranmeybeyah gates. The distance is 3½ miles more than by the direct road.

The same route described from Cairo to Suez.

The following is principally from Outram's report, and he derived his information from the journals of Mr. Lieder and Lieutenant Constable.

Leaving Cairo you travel due south to Bazatien (Bar bela Maiah), a distance of three hours' ride. The road then enters a valley running nearly due east, bounded by the Mokattim range to the north and Ataka range to the south. The way through the valley is equal to any carriage road in England. Twenty men could easily walk abreast in the narrowest part of it. The road gradually but imperceptibly ascends the whole way. At the termination of this valley it turns south-east and enters an extensive sterile plain covered with masses of petrified wood exceeding in size any living tree in Egypt. Two hours were occupied in crossing this plain, still gradually ascending, when a small valley crosses, over which the road continues, to the summit of another plain. Here Mr. Lieder encamped in sight of mountains called Gibel Lakmoon, on the side of which there is said to be water. At about 25 miles from Cairo the Derb-el-Tarabin (Route 15) branches off to the east and joins the Derb-el-Hamra (Route 13) at El Maggra. The road for two hours continues over sand and pebbles, then enters the valley called Wadi Dagelly running north and south; here is a bed of oyster shells. From thence the Derb-el-Tarabin goes off to the east and joins the Derb-el-Hamra; a road also runs direct to Cairo over a mountain plain into the valley which passes between Gebel Hamer (or the red mountain) on the right, and the Mokattim hills on the left. In three hours from the last encampment the first well is reached. The valley here is upwards of 150 feet wide. The well, which contained a great quantity of tolerably good water, is about 10 or 12 feet in diameter, and 20 feet down to the surface of the water. Soon after leaving the well, they (Mr. Lieder's party) turned towards the east and descended a smaller valley which brought them to an extensive plain called the Saloon of Kaishoon. This elevated plain is probably the highest in that part of the desert. At 4½ hours (from starting) they reached the extremity of the plain whence is an extensive view terminated by the Gibel Tye mountains, a lower plain intervening, in the midst of which is a high black hill called Gibel Riboon, at the foot of which they arrived in another hour. One hour and a half after passing this hill the road passes below two similar hills. Thus they continued for seven hours going over plains, hills and valleys.

They then entered the Wadi el Tye, which is wide and level. After travelling 9¾ hours they encamped at Wadi el Kidbut. Here they found plenty of shrubs for the camels and fuel for cooking.

Next day the road at first went through the rocky bed of a torrent with hills on both sides. The direction for the first hour and a half nearly south, then turned east-south-east. After two hours they entered on a wide and beautiful plain, also called Kidbut; it had a very hard bottom of clay, sand, and gravel. Three quarters of an hour later they passed into Wadi Ramleh sandy valley, running nearly due east. Three miles before reaching the Wadi Ramleh at Ras el Wadi Ramleh, the road from the Derb-el-Tarabin to the Wadi Jellallah crosses.

*Wadi Ramleh.**

The Wadi Ramleh is a formidable pass 6½ miles long, the eastern half being only 40 to 80 yards wide, with precipitous hills of 150 to 200 feet high on each side; it is a deep water-course which has cut its way through the hills, the bottom of which is level and sandy, but not deep. After heavy rains it is sometimes dangerous owing to the waters rising in the pass. The higher ranges command the pass, but the plateau or terrace marked *a. a.* on Colonel LeMessurier's map is level, though intersected by deep ravines, and they are accessible from east and west. The western half of the pass opens from 100 to 250 and 300 yards. Near Ras el Wadi Ramleh the ground, through broken, is tolerably open. This pass can be turned, and the heights on either side afford a very open and level ground for flanking parties.

The main range of hills from which the spurs spring, and through which the pass takes its course, are according to Colonel LeMessurier distant and out of range.

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* Taken from Remarks on Col. LeMessurier's map (Egypt). General map No. 9 – Middle Egypt—Military Depôt.

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Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	VARIOUS.	Bir-el-Beydeh is about 6½ to 7 miles from Wadi Ramleh, and about 10 from Bir-el-Guebbe; it is situated in the bed of a large water-course, is supplied from springs and the winter rains; it is sometimes dry in October and November. Water sweet, and enough for 100 camels a day. The water-course abounds in petrifactions, and its south bank, which is 6 to 7 feet high, is composed of preserved, not petrified, oyster shells between this point and the Nile, a little south of Cairo. By this road, *viz.*, Derb el Wadi Ramleh, the country abounds in petrifaction. *N. B.*—This road passes through what is commonly called the "Valley of the Wandering" in old maps. Near Bir el Guebbe, which is about 3 miles from the Red Sea, roads come in from Atfieh and Cosseir. The water is brackish but drinkable; the volume of water when visited by Colonel LeMessurier was 5 feet long by 3 feet broad and 1½ feet deep. It is supplied by springs. Other wells might be dug, and there are some rushes and shrubs near it. At Bir el Guebbe the road assumes a northerly direction, and follows the coast of the Red Sea to Suez.						

17.

SUEZ TO CAIRO.

BY DERB EL BIRKET EL HAJ.*

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	LIEUTENANT-COLONEL LEMESSURIER.	BIR EL SUEZ ...	2	4	...	...	... ...	See Route No. 13.
		FORT OF AJRUD	10	0			... ...	
			—	—	12	4		Lieutenant-Colonel Le Messurier in Route Derb-el-Hamra, page 342, makes the Derb-el-Birket branch off at Fort Ajrud—also see page 356. But Horse Guards report and Murray agree in saying that the separation is at defile of El Muktala. There seems to be some confusion between this road and the Derb-el-Hamra, also called Derb-el-Haj. At Fort Ajrud the road from Mekka across the Peninsula of Sinai comes in from east. Apparently the road runs north-west from Fort Ajrud, passing north of Jabal Awebet, and at about 12 miles turn east-by-north. At 15 miles road to right goes off in direction north-west to El Tel-el-Kibir. At 32 miles another road north-west to Belbeis. At 36 miles cross Wadi Jandali. Dar-el-Baidar (Viceroy's palace) 3 miles south.
		BIRKET EL HAJ *or* LAKE OF PILGRIMS.	58	0			... ...	From 42 to 45 miles skirt a hill to the north (Linant's map). At 50 miles cross the direct road from Cairo to Ismailia and El-Ferdane. Then cross blowing sands to El Birket-el-Haj (the Lake of the Pilgrim) at 58 miles.
			—	—	70	4		
		CAIRO ...	14	0			... ...	From Birket-el-Haj road turns south-west by a stone ruin called Es Sibil (the fountain), and passes by Heliopolis to Cairo.
			—	—	84	4		

Note.—Colonel LeMessurier states the distance from Suez to Cairo by this road as 90 miles. He gives no intermediate distances, but says Cairo to Birket-el-Haj is 10½ miles, and Suez to Ajrud is 12½ miles. This leaves 67 miles for the distance from Fort Ajrud to the Lake. Linant's map, however, shews this distance as only 58 miles.

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* This is called Derb el Ban on Wylde's map of Isthmus of Suez.

18.

SUEZ to CAIRO.

BY DERB EL AUGERBEEYEH.

Territory.	Authority.	Names of Stages.	Distance. Stage. Miles.	Distance. Stage. Fur.	Distance. Total. Miles.	Distance. Total. Fur.	Rivers.	REMARKS.
EGYPT.	LIEUT.-COLONEL LeMESSURIER.	This is an intermediate road between the Del-el-Hamra (Route No. 13) and Derb-el-Tarabin (No. 15).						
		Bir el Suez ...	2	4			... ...	See Route No. 13.
		Fort of Ajrud	10	0	12	4	... ...	
		El Muktala ...	6	4	19	0	... ...	
		El Maggra ...	11	0	30	0	... ...	
		Cairo ...	56	0	86	0	... ...	At ¾ mile pass No. 11 station-house, and branch to left. This road is taken by Arabs for the convenience of forage. It enters Cairo by the south of the Red Hill. *Note.*—There is no further description of this road, which is not mentioned by Murray or in the Horse Guards' Report.

19.

SUEZ to ATFIEH on the NILE.

BY ROAD SOUTH OF WADI RAMLIYE.

Territory.	Authority.	Names of Stages.	Distance. Stage. Miles.	Distance. Stage. Fur.	Distance. Total. Miles.	Distance. Total. Fur.	Rivers.	REMARKS.
EGYPT.	LIEUT.-COLONEL LeMESSURIER.	Well of Guebbe.	23	0	...	...	... ...	See Route No. 16.
		Abu Tini ...	50	0	73	0	... ...	Distance not given, but probably about 2½ days' camel journey. Water sweet from springs, and seldom dries up. Enough for 500 camels.
		Sherk Atfieh	30	0	103	0	... ...	One day and half of camel journey. At about 1¼ days' journey from Sherk Atfieh there is a remarkable pass called Rash Rash; it is described as following the water-course, is very narrow, and of the same character as the Wadi Ramliye (see Route No. 16).

This road is described as occupying five days with laden camels. It is good and generally level, and in some places stony, but no hills are crossed. It is taken by the kafilas proceeding with grains from the Nile to Suez. Before reaching Atfieh there is a branch north to Shorafeh and Helwan; it leaves this road at the Wadi Jullalah, and runs to the village of Juminazeh.

Bir Kamas appears to be on this road, and the total distance by maps does not apparently exceed 100 miles.

20.

WELLS OF JANDALI TO HELWAN SOUTH OF TORA.

BY DIRECT ROAD.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	Remarks.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	LIEUT.-COLONEL LeMESSURIER.	WELLS OF JANDALI.	...	...	...	..	... ...	See Route No. 16.
		HELWAN ...	24	0	24	0	... ...	From the wells the road crosses an open country to the Wadi Dejti, one of the main waterlines connected with the Bahar-be-la-Ma. At 9 miles from the wells, it ascends by a very gradual slope one of the offshoots of the range which bounds the southern side of that valley, and passes over an extensive table-land on the summit. For 5 or 6 miles the road follows the water-ledge (*sic*), whence the peculiar features of the country are seen, seamed and cut up by numerous deep ravines, the heads of which extend to the summit of the range, and render it impossible to descend except at a few particular points. At the south-west extremity of this table-land, the road descends gradually into a large water-course which flows to the Nile, and thence over a low range (equally easy) it leads to the village of Helwan. This road is good throughout and generally level, the only difficult part for guns being at one spot, a steep descent of about 50 yards, which 50 men could clear and level in about half an hour. *Note.*—Helwan according to Leake's, Linant's and other maps is only 4½ miles south of Tora. Colonel LeMessurier calls it 10 miles. Another road from the wells runs to the village of Shorafeh.

21.

SUEZ TO CAIRO.

BY NEFICHE (JUNCTION FOR ISMAILIA) AND THE CANALS.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	Remarks.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.		SUEZ ...	...	...	...	...	... ...	The road lies along the bank of the fresh-water canal; the railway is on the west and the ship canal on the east. No description of the sweet-water canal towing path. Sir A. Clarke from memory considers it about the same width as usual in England, and passable for

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Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.		SUEZ—contd. ...	...	...	...	...	... ...	artillery. This canal is navigable for boats drawing 2 or 3 feet of water. At 4 miles the caravan route to Mekka crosses into the Peninsula of Sinai. At 6 miles pass one of the "gares" or basins formed in the maritime canal for ships to pass. Major-General MacDougal says (*Horse Gd. Rt.*, page 202) "the sweet-water canal has provided a good road for the march of an army from Suez to Cairo, giving all the advantages of the desert in respect of immunity from inundation, and all the advantages of the cultivated country in respect of supplies. The country between the two canals between Suez and Ismailia will soon be converted into a garden through the agency of the Nile water."
		CHALOUF ... (*R. Station*).	11	2	11	2	... ...	The Chalouf cutting of the maritime canal begins about a mile south of Chalouf and extends for 6 miles. From Chalouf the maritime canal runs nearly due north, while the sweet-water canal and railway bend eastward.
		GENEFFE ... (*R. Station*).	12	0	23	2	... ...	Sweet-water canal winds a little, skirting the Great Bitter Lake from 2 miles, while the railway takes a straighter course.
		FAID ... (*R. Station*).	12	0	35	2	... ...	From Faid the sweet-water canal (as well as the railway) bends eastward, still skirting the Great Bitter Lake. At 8 miles it is again close to the maritime canal, which is here a cutting from 30 to 40 feet deep.
		SERAPEUM ... (*R. Station*).	10	2	45	4	... ...	Village of Sérapéum is 2 miles from the railway station. *Note.*—On M. Linant's map this place is marked as ancient Arsinoe, Daneon de Pline, and is shown as surrounded by a circle of sand-hills 2½ miles in diameter, the ruins being on a hill in the centre. Sweet-water canal and railway gradually diverge from the maritime canal. At 4¾ junction of the Suez-Ismailia sweet-water canal with the Cairo-Ismailia canal. Then cross the railway which here branches to Ismailia.
		NEFICHE ... (*R. Junction*).	7	2	52	6	... ...	Nefiche railway station is 1 mile north of the canal. From the canal junction the road to Ismailia goes north-east along the branch canal to that place about 2½ miles where that canal ends. The supply of water for the maritime canal stations and Port Said is pumped from the branch above mentioned by powerful engines through a double row of cast-iron pipes. The fresh-water canal is connected with the maritime canal (at Ismailia) by a short branch. The difference of level is 17 feet, to overcome which there are two locks, one just below Ismailia the other near the upper part of the town.

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Territory.	Authority.	Names of Stages.	Distance. Stage. Miles.	Distance. Stage. Fur.	Distance. Total. Miles.	Distance. Total. Fur.	Rivers.	REMARKS.
EGYPT.		NEFICHE—contd.	...	...	52	6	... ...	Ismailia forms the central depôt of the Canal Company. It has a mosque, church, banks, hotels and cafés, theatre, bazaar, hospital, avenues, and square.
		MAHSAMEH ... (*R. Station*).	14	0	66	6	... ...	The canal from Nefiche runs on the south side of the railway and close to it. At 5 miles it diverges somewhat, but after reaching an extreme distance of about a mile again approach the line, and at the Mahsameh station is close to it. There is a narrow strip of cultivation along the canal. Beyond is the desert on both sides. At about 8 miles Abu Reheb, supposed to be the Rameses of the Bible, is passed on the north.
		TEL EL KIBIR ... *or* TEL-EL-WADY (*R. Station*).	14	0	80	6	... ...	Road still along the fresh-water canal and through the Wadi Tumilat, now the El Wadi estate of the Canal Company, a richly cultivated tract, which gradually widens out. At Tel-el-Kibir it is 2½ to 3 miles in width. The old Wadi canal comes from Zagazig to Ras el Wadi or Mahsameh, keeping on the northern edge of the valley. This district was reclaimed from the desert by Mahamad Ali about 1830.
		BELBEIS ... (*R. Station*).	18	4	99	2	... ...	From Tel-el-Klbir road turns south-west, leaving canal and railway, and skirts the desert (on the left) for 5 or 6 miles. From 6 miles the road runs along the canal all the way to Belbeis in a nearly straight course. At Belbeis the Cairo-Zagazig railway is reached.
		EL KANKA ...	18	4	117	6	... ...	See Routes 33 and 34 Cairo, to El Arish.
		CAIRO ...	14	0	131	6	... ...	

22.

COSSEIR TO SUEZ.

BY THE SEA COAST.

Territory.	Authority.	Names of Stages.	Distance. Stage.	Distance. Total.	Distances from Coast.	REMARKS.
			Dromedary reckoning.			
EGYPT.	VARIOUS.	COSSEIR ...	...	Total ...	... ...	From Horse Guards' Report, p. 150.
		EL GWEIH ...	1½ day	...	1 hour ...	("Gouay"—*Keith Johnston*).—Wells.
		HWEITAT ...	1 „	2½ days	1½ „ ...	("Om Hoetat"—*Keith Johnston*).—A well in Wadi Sigar according to Keith Johnston.

Territory.	Authority.	Names of Stages.	Distance. Stage.	Distance. Total.	Distances from Coast.	REMARKS.
EGYPT.	VARIOUS.		*Dromedary reckoning.*			
		ABOU SHAAR ... *or* MYOS HORMOS.	3 days	5½ days	3 hours ...	Keith Johnston shows this place on the coast. Water brackish. Good water is obtainable one day west at Ammonfeh. The ruins of Myos Hormos are on the coast in latitude 27° 24′. The town is small, very regularly built, surrounded by a ditch with round towers at the corners, the faces and the gateways. The port which lies to the northward is nearly filled with sand. Below the hills to the eastward is the Fons Tadmos mentioned by Pliny (*Outram*).
		L'MLAHA ...	½ day	6 „	4 „ ...	A well. Two hours west is a spring at Kufra; 3 hours west another called Moiet-el-Mesaod. Jebel-el-Zayt, "the mountain of oil," is close to the sea opposite Ras Mahamad (in Arabia) between latitude 27° 50′ and 28° 3′. It abounds in petroleum, whence its name; and at El Gimsheb, a headland terminating to the south-south-west, are some sulphur mines. From Cosseir to the centre of Jebel-el-Zayt is about 90 miles, and from thence to St. Paul's about 60 (*Outram*).
		JABAL GHARIB .. *or* MOUNT AGRIB.	½ „	6½ „	6 „ ...	A natural reservoir. After a heavy fall of rain there is a two years' supply (for how many camels not stated).
		ZAFARANA ... *or* CONVENT OF ST. PAUL.	2 days	8½ „	4 „ ...	A well. Wadi Zaferaneh shown on Kiepert.
		KUSEIB ...	2 „	10½ „	Close to sea	A well.
		ABU DARAJ ...	2 hrs.	10$\frac{7}{12}$ „	... ...	A well. The Abou Daraj (or Deradj) mountains stretch into the sea. The journey across them is described as very difficult, and occupies six hours.
		ODHEIB ...	1 day	11$\frac{7}{12}$ „	¾ hour ...	A well.
		SUEZ ...	1 „	12$\frac{7}{12}$ „		
		TOTAL ...	say	13 days		

Note.—On all maps the distance is from 290 to 300 miles, without allowing for windings of the road. The above computation would seem to allow only 23 miles per day for a dromedary. As 32 miles is generally noted as feasible, the windings and difficulty of this road must be considerable.

Outram mentions this as a route by which camels might be despatched overland from Cosseir to Suez. It is thus described by Colonel LeMessurier :—"The road from Cosseir to Suez by the sea coast will be found not a very bad one. Water is found in some six places. By deviating from the direct line it is twelve days' journey, but a Bedouin could go by the direct road in eight or nine."

Mr. Badger made particular enquiries respecting this route from Sheikh Khamees, the Wakeel of the principal Sheikh of the Maaza tribe. The whole district is inhabited by Arabs of that tribe, who are not confined to any particular locality, but wander about from the coast to the hills in search of pasture. The road by the coast is level except in one part, where the Abou Daraj mountains stretch into the sea. Water, but not in large quantities, is procurable at the places noted. (See also route 23.)

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23.

COSSEIR TO SUEZ.

BY THE SEA COAST.

Taken from Lieutenant-Colonel LeMessurier, p. 369. From a description by Suliman Mubarik, an Arab Shekh of the tribe of Maazi, who was the Government guardian of the road between Cosseir and Keneh and that neighbourhood. (See also Route No. 22.)

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	LIEUTENANT-COLONEL LeMESSURIER.	GOOYEG *or* GOOYEKE.	10	0	...	...	... ...	Gooyeg is close to the sea near old Cosseir. Water from springs. This place is celebrated for its shells. Several fishermen are found here with their boats, &c. No supplies.
		NUKHEEL-I-DULFEY.	Not given		...		...	Road leaves the sea. Water at Nukheel-i-Dulfey abundant and sweet.
		JABAL-UM-MOOMFIYEH.	Ditto ...		...		...	Water sweet and abundant both from rain and springs. It is collected in the hollows and recesses of the water-courses, and is said to last more than a year. One day's journey from the sea.
		JABAL GUTTAR...	Ditto ...		...		...	Water sweet and plentiful (enough for 1,000 camels) from a rock. After a heavy fall of rain lasts for two or three years.
		JABAL DOKHAN	Ditto ...		...		...	No water.
		KOOFRAH ...	Ditto ...		...		...	Is near Jabal Dokhan. The sea within sight. Brackish water enough for 300 camels.
		DARREH ...	...		...	...	...	Road inclines away from the sea. Water, but less than at next halt.
		GARIB ...	One day (of a camel)				...	Plentiful supply of sweet water; enough for 2,000 camels. Supply described as the most abundant on this road.
		EL HOWASHEEYEH.	Not given		...		...	Road inclines away from the sea.
		ABOU DARAJ ...	One day ...		...		...	Water from a recess in the rock, collected from rain, but plentiful. One day from the sea. Steamers send their boats from Suez for water. Supply limited from 4,000 to 5,000 gallons a week, according to a naval officer who had visited the place.
		SUEZ ...	Two days...		...		...	Well of Guebbe (route 16) rather beyond half way.

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24.

ASSUAN TO CAIRO.

BY LEFT BANK OF NILE.*

Territory.	Authority.	Names of Stages.	Distance. Stage. Miles.	Distance. Stage. Fur.	Distance. Total. Miles.	Distance. Total. Fur.	Rivers.	REMARKS.
EGYPT.	LINANT—MURRAY—HORSE GUARDS REPORT.	ASSUAN ...	...	...	...	...	... ...	Assuan on right bank. The first cataract is a rocky passage extending about 1,300 yards above Assuan. The highest fall does not exceed 5 or 6 feet. Passable for boats at all times of the year, and little fear of accidents, but most easily at high Nile. Boats are towed up, but may be rowed down. Nile at Assuan about ½ mile wide. Environs sandy and barren, producing little but dates, which are good. Road between river and mountains, which are close together.
		DEIRAWEH ...	20	0	20	0	... ...	Deiraweh on right bank. "A few miles north of Deiraweh, after passing a large island, the road divides, one branch continuing on in the valley, the other running behind the mountains. The latter adopted by Belhard and Desaix in January, February, 1799. These branches unite again opposite Jebel Silsileh."
		JEBEL SILSILEH	20	0	40	0	... ...	Jebel Silsileh on right bank. Nile 1,095 feet broad at narrowest part (*Murray*), 1,300 feet, and velocity 8 feet per second (*Linant*). "Roads unite opposite Jebel Silsileh, that in the valley turning in towards the desert road. Shortly afterwards the road again returns to the valley and runs on to Edfou."
		EDFOU ...	27	0	67	0	... ...	Edfou on left bank. During the winter months geese, teal, and other wild fowl frequent a marsh or lake to the westward of Edfou (*Murray*). Road runs close to the river to Esneh. Routes from Edfou (right bank) to Red Sea. See Routes 6, 3, 10. All the inhabitants of the environs of Esneh and Edfou have frequent relations with the oasis, to which they transport grain and other provisions.
		ESNEH ...	30	0	97	0	... ...	Esneh on left bank. Road continues close to the river as far as Dindereh. At Esneh roads come in from the oasis of Selimeh and of Shibb, and from the great oasis. (Linant's map.) (*Murray.*) At Jebelayn, about 12 miles north of Esneh, the road is apparently commanded for a distance of 2 miles by ridges parallel to the river. At Resegat, 26 miles, the river bends sharply to the east, and here a track comes in from the great oasis (*Horse Gds. Report*), and a road up the mountains in a north-west direction turns

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* Actually used by Desaix, February 1799.

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Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	LINANT—MURRAY—HORSE GUARDS REPORT.	ESNEH—contd.	...	...	97	0	... ...	at the summit nearly north, and leads direct on Farchiout. Resegat-Farchiout 45 miles (Linant's map).
		KARNAK AND RUINS OF THEBES.	32	0	129	0	... ...	Luxor, Karnak and ruins of Thebes on right bank. Opposite Karnak the river runs close to the western mountains, and offers a strong position at Koorneh. From this point a road is shewn by Linant up a deep ravine due west to the summit, and thence direct to Farchiout. Koorneh-Farchiout 40 miles.
		BALLAS ...	30	0	159	0	... ...	On left bank, well known for manufacture of jars (Ballasee). On opposite bank is Guft, from whence a route to El Agaytah and Kosseir. (See Route 8.)
		DENDERAH ...	12	0	171	0	... ...	Denderah on left bank. River bends to west. On right bank is Keneh, from which roads lead to Kosseir. (See Routes 11 and 1.) "Keneh is an emporium of trade with the Arabian coast by way of Kosseir, which it supplies with corn; has a market on Thursdays. Excellent dates are sold." (*Murray.*) The distance from Keneh to Cairo by the main or post road, the Sicca Sultani, is 375 miles. It is confined to the western or left bank of the Nile, and passes through the principal towns and villages, takes generally a direct line, avoiding the long reaches of the river; it is therefore shorter than the river route. It is kept in good order, passes over a raised causeway from village to village, practicable at all seasons of the year, with generally substantially-built bridges over the canals. During low Nile the road occasionally takes a more direct line over the cultivated lands. This road is sufficiently broad for artillery. (*Col. LeMessurier.*) From Denderah road runs more inland along the foot of the mountains to be out of the way of inundation, but Linant shews it along river bank. (*Horse Gds. Report.*)
		FARCHIOUT ...	30	0	201	0	... ...	On left bank; formerly a town of consequence, but has fallen off. Is the head-quarters of the Nizam. The inhabitants famous for breeding and managing horses. At Farchiout a road comes in from the great oasis. (*Horse Gds. Report.*) Both banks of the river in the vicinity of Farchiout are well irrigated, the left bank especially. (*Linant.*)
		GIRGEH ...	25	0	226	0	... ...	The valley road again approaches the river at Girgeh, and continues close to it as far as Menchieh, crossing numerous small canals and water-courses. (*Horse Gds. Report.*) Incompletely shewn in Linant's map. Girgeh on left bank. Formerly the capital of Upper Egypt. Still claims from extent and population the second rank after Siout. (*Murray.*)

GSL

Territory.	Authority.	Names of Stages.	Distance. Stage. Miles.	Distance. Stage. Fur.	Distance. Total. Miles.	Distance. Total. Fur.	Rivers.	REMARKS.
EGYPT.	LINANT—MURRAY—HORSE GUARDS REPORT.	GIRGEH—contd.	...	...	226	0	... ...	The province of Girgeh from Menchieh downwards is covered with small hamlets called Nagé containing some brick houses. The province is very well cultivated, and is covered with clumps of trees and palms around the villages. The inhabitants are Hawaris, more warlike than the Egyptians. They breed many good horses, and are good riders. (*Linant.*)
		MENCHIEH ...	13	0	239	0	... ...	From Menchieh the road runs to the west of the Sohagieh canal, along the foot of the mountains, at a long distance from the river to Siout. (*Horse Gds. Report.*) Shewn in Linant's map. Also an interrupted line shewn along the Nile bank. Linant shews a road coming in from the desert.
		SOHAG ...	10	0	249	0	... ...	On left bank. Is better built than the majority of Fellah villages, with some good houses and mosques. The head of the Sohagieh canal, which irrigates left bank to Siout.
		SIOUT ...	65	0	314	0	... ...	Siout is a railway station, and is situated on left bank. At Siout the river makes a bend, and consequently the mountains and road approach it. At Siout a road comes in from the great oasis (also Linant). From here the valley road runs straight to Cosseir, cutting off the angle of the river at Manfalout, abreast of which town it crosses the Ibramieh (Sohagieh) canal, and approaches the river. (*Horse Gds. Report.*) Not so shewn in Linant. Siout is the capital and residence of the Governor of Upper Egypt. It is of considerable extent, with several bazaars, baths and some handsome mosques. Has several gardens in the vicinity. Bazaars are well supplied, with a market on Sunday. Population 20,000, of whom 1,000 are Christians. Siout is the resort of caravans from Darfur, which come through the great oasis. (*Murray.*) At Siout, Mallarvee, &c., plenty of horses are procurable. Sheep in abundance at from Rs. 3½ to Rs. 5 each (1850).
		MANFALOUT ...	20	0	334	0	... ...	A railway station, situated on left bank. Is a *bender* or market town, and the residence of a local Governor. It is of considerable size, with the usual bazaar and a pretty good bath. Has a market day every Sunday, and several gardens outside the walls. (*Murray.*)
		COSSIEH ...	12	0	346	0	... ...	On left bank near railway station Neslet Ganoub. From Cossieh the road runs straight to Minieh, passing for a short distance quite close to the bank of the river opposite a large island at Minehat Dabes. (*Horse Gds. Report.*) Linant shews the head of Bahr Jousef canal at Cossieh. The Bahr Jousef is the large canal on the western side of the Nile, running generally parallel to the river at distance of 2½ to 3 miles. It varies from 30 to 50 yards wide,

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	LINANT—MURRAY—HORSE GUARDS REPORT.	COSSIEH —contd.	...	...	346	0	... ...	and from middle of July to end of September would be navigable for small boats. It is bridged over at every 3 or 4 miles, the archways of the bridges having sluices to raise or let off the water. These archways would not be large enough for boats to pass through, not only on account of narrowness, but because there would be little or no headway when the canal is full. From Bedreshayu to the pyramids at this season the country is one sheet of water 1 to 3 feet deep, broken only by the causeways between the villages, which are about 20 feet wide. (*Col. LeMessurier.*) About 8 miles from Cossieh is the railway station of Deyrout.
		MELLAWEH ...	15	0	361	0	... ...	On left bank. Has the rank of a town (*bender*), and a market every Sunday. Is also a railway station. At 5 miles the Railway Station of Rodah. At 17½ the Railway Station Abou Kourkas near the large island of Menchie Dabes.
		MINIEH ...	30	0	391	0	... ...	On left bank. A railway station. Is a *bender*, and has a market every Sunday, and baths. (*Murray.*) From Minieh the road again runs along the foot of the mountains, at a distance from the river, crossing to the western bank of the Bahr Jousef not far from Samalout. It next reaches Benesheh, from whence a road goes to the little oasis. (*Horse Gds. Report.*) Not shewn in Linant's map, but a road shewn between foot of mountains and the lower sand-hills.
		SAMALOUT ...	15	0	406	0	... ...	On left bank. A railway station. The following railway stations are on the line from Samalout to Feshn, where the road again meets the railway :— Kolosana, Matayeh, Beni-Mazar, Aba-el-waf, Magazeh, Salagoos. (*See Railways.*)
		BENESHEH ...	25	0	431	0	... ...	On left bank, between Bahr Jousef and the mountains. The position of Benesheh is far from advantageous, the Libyan desert having made greater encroachments there than in any other part of the valley. Downs of sand covered with bushes extend along the edge of its cultivated land, to the west of which is a sandy plain of great extent with a gentle ascent towards the hills of the Libyan chain, and behind these is a dreary desert. It is still the residence of a Governor. In the time of the Mamelukes it was one of the principal towns of Modern Egypt. At the period of the Arab conquest it was a place of great importance and strength. (*Murray.*) The slopes and foot of the hills are sandy, the heights stony with coarse gravel on chalk beds. The Bahr Jousef is a natural water-course, and not an artificial canal. It apparently commences at Mellaweh, but is connected with the Sohagieh canal. (*Linant.*) From Benesheh is a frequented road, about 3 days' journey to the little oasis.

GSL

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	LINANT—MURRAY—HORSE GUARDS REPORT.	FESHN ...	22	0	453	0	... ...	From Benesheh the road runs to Feshn on the Nile, re-crossing the Bahr Jousef. Another road, however, according to Linant's map, keeps straight on along the western bank of the canal, and leads to Fayoum. (*Horse Gds. Report.*) Feshn is a railway station, and 8 miles north is Bibeh railway station.
		BENESOUF ...	24	0	477	0	... ...	From Feshn the road runs along the river to Benesouf. (*Horse Gds. Report.*) (Not shewn in Linant.) Benesouf is the capital of the province, a railway station, and the residence of the Governor. It has a manufactory of silk and cotton stuffs. A market is held every week, but is badly supplied. From Benesouf is one of the principal routes to the Fayoum, and the brick pyramid of Illahoon, at the north-east of the entrance to the Fayoum, may be seen from the town. On the opposite bank of the Nile is the Wady Byad, by which the road leads to the monasteries of St. Anthony and St. Paul, situated in the desert near the Red Sea. (*Murray.*) (See Route No. 7.) Nine and half miles north of Benesouf is Echmente, or Ashmant railway station, and about 9½ miles further is El Wasta, the junction for the Fayoum, and the nearest station to Atfieh on right bank.
		RIGGA EL KIBIR	25	0	502	0	... ...	On left bank opposite Atfieh. From Benesouf the valley road runs on to Ghizeh, opposite Cairo, passing innumerable water-courses and canals used for irrigation purposes. (*Horse Gds. Report.*) No road shewn here by Linant, but a track along the river and another between the hills and the Bahr Jousef. At 15 and 24 miles, roads lead across the desert to Fayoum. The latter, according to Murray, one of the principal routes across the desert (see Route No. 27, El Kafr to Medineh). The railway stations of Kafr Amar and Kafr-el-Ayat are between El Wasta and Bedresheyn.
		BEDRESHEYN AND RUINS OF MEMPHIS.	29	0	531	0	... ...	Bedresheyn is a railway station. The ruins are between it and the village of Mitrahenny. Its lofty mouuds may be seen from the river. (*Murray.*) Ghizeh railway station is 12 miles from Bedresheyn, and Boulac Dacrour, the junction for Cairo, 2 miles beyond.
		CAIRO ...	16	0	547	0	... ...	Road not shewn in Linant's map. Distance in a straight line apparently 12 miles.

GSL

25.

EDFOU TO CAIRO.

BY RIGHT BANK OF NILE.

Territory.	Authority.	Names of Stages.	Distance. Stage. Miles.	Stage. Fur.	Total. Miles.	Total. Fur.	Rivers.	REMARKS.
EGYPT.	LeMESSURIER, LINANT, HORSE GUARDS REPORT, &c.							This road was used by General Belliard in 1799. For commanding positions along this road, see "River Nile," page lvii; see also Route No. 24; and "Railways," p. xcviii.
		EDFOU ..	...	...	...	...	... ...	On left bank of Nile. Horse Guards' Route says—the road commences a short way south of Edfou, opposite the island of Gezireh, and follows the course of the river, the valley being narrow. Linant's map, however, shews no road south of a point 10 miles north of Esneh on the left bank. For communications with Red Sea, see Routes 6, 3, 10.
		RUINS OF THEBES	60	0	60	0	... ...	The road passes the ruins of Thebes, keeping close to the river. For communications between Thebes and Red Sea, see Route 9.
		GUFT ...	30	0	90	0	... ...	On right bank. For communications with Red Sea, see Route No. 8.
		KENEH ...	10	0	100	0	... ...	Road stops at Keneh according to French official map; but Linant's map shews it as continuing along the river bank almost to Farchiout. Keneh is an emporium of trade with the Arabian coast by way of Cosseir, which it supplies with corn. Has a market on Thursdays. Excellent dates are sold. See Routes 11, 1. Right bank. "There is a good road from Keneh to Cairo on the eastern or right bank; but it is neither so frequented nor so good as that on the left bank. It is liable to obstructions from the projecting headlands of the eastern range of hills, which rise in many instances precipitously over the river. At such places, the road passes over these headlands. It is considerably shorter than the post road. Laden camels, horses, mules, &c., travel with much ease; it may be considered a desert road, and is at no spot at any great distance from the cultivated lands. Numerous branches lead to the villages on the river for convenience of supplies and water. The road is practicable for artillery in such parts as I saw it; difficult places might be made accessible by a few sappers." (*Col. LeMessurier.*) "At Keneh horses are procurable at from Rs. 150 to Rs. 180 (1850 ?)." (*Outram*, page 173.) "From Kenneh to Cairo the river is practicable throughout for boats of considerable burthen. Steamers of 100 to 150 tons ply on it at all seasons." (*Col. LeMessurier.*)

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	Remarks.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	LeMessurier, Linant, Horse Guards Report, &c.	Keneh—contd.	...	...	100	0	... ...	The following is a statement of the time occupied by boats and steamers going up and down stream from Keneh to Cairo :— *Down Stream.* Steamers ... ... 4 days. Sailing boats ... ... 8 to 12 days. *Up Stream.* Steamers ... ... 8 days. Sailing boats— 1.—With northerly winds prevalent from October to February, average ... 12 „ 2.—In the absence of wind, or during southerly winds, average ... 20 „ The rate of the stream during low Nile per hour ... ... 2½ miles. Ditto ditto high Nile ... 3½ „ (*Col. LeMessurier, 1850.*) Boats are to be found at all the larger towns in Upper Egypt, and also pilots.
		Farchiout ...	35	0	135	0	... ...	On left bank, formerly a town of consequence, but has fallen off. It the head-quarters of the Nizam. The inhabitants famous for breeding and managing horses. At Farchiout a road comes in from the great oasis. Both banks of the river in the vicinity of Farchiout are well irrigated, the left bank especially. Linant's map shews a caravan road across the mountain spur north of Farchiout. Here is Commanding Point No. 9 (page lvii).
		Girgeh ...	25	0	160	0	... ...	On left bank. The road commences again opposite Girgeh, and runs along the desert to the east of the hills bordering the river to opposite Manfolaut (*Horse Gds. Report*). Linant's map states that from the east of Girgeh to Minchieh the grand route passes along the reverse of the mountain where a wide road has been cut. Here is Commanding Point No. 8. (page lvii).
		Ekmim ...	15	0	175	0	... ...	On right bank. Linant's map shews the main road descending the hills opposite Menchieh (left bank), and crossing a gorge for about 10 miles, rising to summit of the mountain again near a Coptic convent 12 miles north-east of Ekmim. Also states that a large road with stations containing buildings, wells and cisterns leads from Ekmim to Cosseir on the Red Sea, passing up the gorge past the convent. (This road not noted in *Horse Gds. Report.*) Ekmim, the size of an ordinary Egyptian *bender*, with a bazaar and a market day every Wednesday. (*Murray.*) Sohag and Menchieh opposite Ekmim on left bank (see Route 24, left bank). Linant's map shews a road along foot of the hills through Gaon-el-Kibir as far as Siout, when it joins main road. This road is apparently interrupted at two places, *viz.* :—for about 3 miles by a spur opposite Tartha, 10 miles south of Gaon-el-Kibir, and again for about 10 miles half way between Gaon-el-Kibir and Siout opposite Aboutig. The cause of break is not apparent. Here is Commanding Point No. 7 (page lvii).

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Territory.	Authority.	Names of Stages.	Distance. Stage. Miles.	Distance. Stage. Fur.	Distance. Total. Miles.	Distance. Total. Fur.	Rivers.	REMARKS.
EGYPT.	LeMessurier, Linant, Horse Guards Report, &c.	Gaon-el-Kibir	35	0	210	0	... ...	On right bank at foot of a gorge about 10 miles wide. The main road crosses the gorge 8 miles east of Gaon-el-Kibir; the lower road as described above. Here is Commanding Point No. 6 (page lviii).
		Siout ...	45	0	255	0	... ...	Situated on left bank. Opposite Siout the road descends the Wadi Siout, and at the foot of the slopes unites with the lower road. Linant's map shews a road leading up the Wadi Siout to Jebel Teyt on the Red Sea.
		Manfalout ...	15	0	270	0	... ...	On left bank. About 10 miles due east of Manfalout and 13 due north of Siout is the Coptic convent of Dayr. Here the road ascends the mountain of Jebel Abou Feyda, continuing for about 20 miles along the summit. During this distance the mountains intercept passage by the river bank, and are difficult to descend. The road then crosses a gorge for 5 miles (Linant's map). Here is Commanding Position No. 5 (page lviii).
		Mellaweh ...	30	0	300	0	... ...	On left bank. Opposite Mellaweh the route again crosses a narrow spur of the mountains, then runs at the foot for 5 miles to Sheik Abadé at the foot of the Wady Gamous, up which Linant shews a road to the convents of St. Anthony and St. Paul. (No information in *Horse Gds. Report*). From Sheik Abadé for 4 miles the road crosses a spur. This is approximately the boundary of Upper and Middle Egypt. For 10 miles the road runs at foot of hills and then crosses a gorge 5 miles to opposite crest, continuing another 10 miles on summit of Jebel Tair opposite Minieh. A lower road along foot of hills is shewn, joining the upper one 5 miles north of Minieh. (*Linant.*)
		Minieh ...	29	0	329	0	... ...	On left bank. Five miles north of Minieh, the upper and lower roads join according to Linant's map. The road then runs for 15 miles over the spurs of Jebel Tair. At 12 miles further the road again separates opposite Abu Girg (left bank), one branch keeping along the Nile, the other passing over a saddle on east side of an isolated hill called Shekh Embarak. Each of these branches is about 20 miles long, and they meet again at El Hibé, about 5 miles south of Fechu (left bank). Jebel Tair is Commanding Position No. 4, and Sheik Embarak is Commanding Position No. 3 (page lviii).
		Feshn ...	57	0	386	0	... ...	On left bank. The road here runs along the steep face of a spur. (*Linant.*) Here is Commanding Position No. 2 (page lviii).
		Bibeh ...	8	0	394	0	... ...	On left bank. Opposite Bibeh the road runs over a steep spur. This is Commanding Position No. 1 (page lviii).
		Benesouf ...	13	0	407	0	... ...	On left bank. The road oposite Benesouf runs between the river and detached hill

CSL

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	LeMESSURIER, LINANT, HORSE GUARDS REPORT, &c.	BENESOUF — contd.	...	...	407	0	... ...	called in Linant's map Jebel Hemour Chiboul. Up the Wadi Byad north of this hill runs Route 7 to the monasteries of St. Anthony and St. Paul and the Red Sea.
		ATFIEH ...	27	0	434	0	... ...	A good road commences at Atfieh and runs into Cairo, and from Atfieh a road runs to Suez (Route 19). The following description of it is given by Mr. Leider:—At Atfieh on the east bank of the Nile, about half way between Cairo and Benesouf, a road leaves the Bahr-el-Nile and runs to Suez, which road is described by the Maazir Arabs, in whose tribe it is, as running through a fine, wide, firm and open valley called the Wady Ghooyur; it is very little mountainous; it is the most frequented by the Suez traders, because of the easy transport it affords their heavily-laden camels. By this road most of the grain intended for the Hedjaz is conveyed to Suez for embarkation. There are no wells by the way, excepting those in the Wady Bediah, which valley it enters one day from Suez. From Atfieh to Suez it is only four days' journey by camels. Travellers may also enter the Wady Ghooyur at Esoof on the Nile, which place is several hours north of Atfieh. The roads from both these places join and proceed together from the Wady Warak.
		HELWAN ...	25	0	459	0		On right bank. Has sulphur springs and a bath-house. About 5 miles north of Helwan is the village of Tourah; this village, which is about 7 miles south of Cairo, possesses the elements of great military strength. Here the Attaka range of mountains approach to within three-fourths of a mile from the Nile. Between the termination of the hills and the bank of the river is situated the village, consisting of fifty or sixty stone-built houses of one and two storeys, closely packed together and skirted by huts of less substantial construction. On the mountains are the ruins of a castle and extensive caves and quarries. Towards Cairo is a plain. Beyond Tourah the Derb-el-Tarabin road to Suez (Route 15) comes down to the Nile near the village of Bussateen.
		CAIRO ...	12	0	471	0		

26.

BENESOUF TO FYOUM.

BY MEDINEH.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	MURRAY AND LINANT.	**Benesouf** ...	...	...	...	...	... ...	On left bank. See Route 24 (left bank). From Benesouf the road runs to the north-west, passing the bridge of Illayun to the Fyoum and the Little Oasis. Medineh, the capital of the Fyoum, is about 20 miles in a straight line from Benesouf; but the road is somewhat longer. (*Horse Gds. Report.*)
		Illahoon ...	15 to 22	0	15 to 22	0	... ...	Variable according to the state of the canals. (*Murray.*) Near Illahoon, on the north side of the gorge, is a crude brick pyramid; also bridge and dyke across the Bahr Jousef. (*Murray.*)
		Medineh ...	15	0	30 to 37	0	... ...	Medineh is a town of some importance, the capital of the Fyoum and the residence of the Governor of the district. Has bazaars, caravanserais, and baths, with a market every Sunday. The cultivable area of the Fyoum measures about 23 miles north and south, and 28 miles east and west. It is superior to the other parts of Egypt from the state of its gardens and the variety of its productions, growing corn, cotton, sugarcane, indigo, vegetables, and fruits in great perfection and abundance. It is cultivated at all times of the year. (*Murray and Linant.*) Many roads lead from the valley of the Nile to the Fyoum, from the neighbourhood of the Pyramids; from El Kafr near Dachour (see Route 27); from Kafr-el-Ayat, south of the latter (see Route 24), left bank; from Ogayt; from Benesouf (Route 26); and from nearly every place between Kerdasy and Benesheh. (*Murray.*) Linant's map shews a road from Tomieh north of Medineh to the Natron Lakes. Also from El Ghereck, south of Medineh, to the Little Oasis; this one is also in *Horse Gds. Report* (see Route 28).

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27.

EL KAFR NEAR DASHOUR TO MEDINEH.

BY THE LIBYAN DESERT.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	MURRAY.	DASHOUR ...	...	..	...	..	... ...	About 5 miles south of ruins of Memphis and 2 miles west of Masghoon (see Route 24, left bank). To Tomieh desert road across low hills.
		TOMIEH ...	26	4	26	4	... ...	On the east side of this town is a ravine called El Botts, 314 feet broad, dyked across by a strong wall retaining the waters to the south for irrigation. This ravine apparently separates a small hill from the main ridge, and this position appears to close the north-east entrance to the Fyoum. The road passes through cultivated ground to Medineh. From Tomieh Linant's map shews a road north-west to the Natron Lakes, and roads on both sides of the lake Birket Kéroon; that south of this lake apparently leading to the Little Oasis.
		MEDINEH ...	18	4	45	0	... ...	Capital of the Fyoum (see Route 26).

28.

THE FAYOUM TO LITTLE OASIS, OASIS OF DAKHLEH AND GREAT OASIS.

BY EL GHERECK.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	MURRAY—HORSE GUARDS REPORT.	MEDINEH ...	...		...		...	See Route 26.
		EL GHERECK ...	1 day—*Horse Gds. Report* ... 20 miles—*Murray.*					South-south-west of Medineh. A town about 700 paces long by 500 paces broad, protected against the Arabs by a wall furnished with loopholes and projecting towers. Stands at the edge of an isolated spot of arable land surrounded by the desert, and watered by a branch of the canal which extends to Nesleh and western side of the Fyoum. (*Murray.*)
		WADEE RYAN ...	½ day—*Horse Gds. Report* ... 20 miles—*Linant.*					On going from the Fyoum to the Little Oasis the valley called Wady Ryan is traversed abounding with palm trees and water; it is not sweet, but good enough for camels. Water for the journey must be carried, and should be taken in at the western extremity of the lands of Ghereck. (*Horse Gds. Report.*)

GSL

Territory.	Authority.	Names of Stages.	DISTANCE.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	MURRAY—HORSE GUARDS REPORT.	ZUBBO IN THE LITTLE OASIS.	2½ days				... ...	The Little Oasis is also reached by a frequented road from Benesheh. It is 200 feet higher than the Nile at Benesouf. It contains several springs of warm water, which, when left to cool in porous jars, is perfectly wholesome and palatable, though said to disagree with strangers in summer. These springs form at Zubbo a pond 30 feet wide and 5 or 6 feet deep. In this oasis are grown a variety of fruit trees, much liquorice, rice, barley, wheat, doora, clover, wild cotton; but the principal source of wealth is the date tree, which yields a very superior quality of fruit. The principal gardens are about El Kasr. The stagnant lakes caused by the surplus water exhale miasma, causing dangerous remittent fever, which annually rages in the summer and autumn. Population of the oasis about 7,000. (*Murray.*) *Roads in the Little Oasis.* Zubbo and Mareeah to ruined village of Bayrees to south-east ... ... 2 miles. Zubbo to Bowitti in the west crossing the hill ... ... 4 ,, Bowitti to El Kasr less than ... ... 0 mile. El Kasr to western limit of cultivation... 1¾ ,,
		EL KASR IN LITTLE OASIS.	¼ day. 6½ miles.					
		OASIS OF EL HAYZ WAH-EL-HAYZ.	1 day				... ...	The oasis of El Hayz is a short day to the south of the Little Oasis. It has springs and cultivated land, but no village. (*Murray.*)
		OASIS OF FARAFREH.	3 days				... ...	About three days from El Hayz are the oasis and village of Farafreh, containing about 50 or 70 male inhabitants. It has a castle or stronghold. (*Horse Gds. Report.*)
		OASIS OF DAKHLEH WAH-E-DAKHLEH.	4 days				... ...	Four days to the south of Farafreh is the oasis of Dakhleh. A great portion of the road lies between two of the numerous high ridges of drifted sand that extend for many miles north and south parallel to each other. There is no water after passing Ain-ed-Dthukker, the halting place of the first day's march. This and the Great Oasis are on the same level as the Nile. El Kasr and Kalamoon are the chief towns of this oasis. Nine and three quarter miles to the east of Kalamoon is the village of Isment. Ballat is 10 miles to the east of Isment. Population of this oasis about 6,500 males. The condition and population of this oasis are superior to those of the other two. It abounds in fruits and dates, and much rice is grown. It contains springs, and is about 15 miles north and south and about 28 miles east and west. (*Murray.*)
		GREAT OASIS WAH-EL-KHARGEH.	3 days				... ...	Three short days to the eastward of the Wah-e-Dakhleh is the Great Oasis or Wah-el-Khargeh. On the road is a small temple and a well of water called Ain-Amoor, surrounded by an enclosure of crude brick. The town of El Khargeh is distant about 13 miles from the hills, which bound this oasis to the east, over which various roads lead to the Nile. The

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Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	MURRAY—HORSE GUARDS REPORT.	GREAT OASIS WAH-EL-KHARGEH—contd.	...				...	length of the central plain in a direct line north and south is about 66 miles, great part of which is desert, with cultivable spots here and there, depending on the presence of springs. The productions are the same as the other oasis; but it is inferior in point of fertility. The caravans from Darfur to Egypt pass through the Great Oasis on their way to Siout. Population of this oasis about 4,300 males. *Roads in the Great Oasis.* El Khargeh to Kasr-el-Goeytah ... 9½ miles. Kasr Ein-ez-Zeyan ... ... 2 ,, Belak ... ... 4 ,, Tomb of Emir Khaled ... ... 2½ ,, Low hills and springs of Dekakeen (just beyond the ruined village to the right) 23½ ,, Bayrees (about) ... ... 8 ,, Temple of Doosh ... ... 8½ ,, Total ... 58 miles.

29.

GREAT OASIS TO THE NILE.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.		GREAT OASIS ...	...	...	...	...	... ...	The roads to Siout and to Abydus (between Farchiout and Girgeh) and Farchiout go from El Khargeh. The northernmost is that to Siout. The only watering place on the way to the Nile is Ed Dayr; it is 6 hours' march for camels on the road to Farchiout and Abydus. Journey to Abydus 32 to 34 hours; to Farchiout 46 hours. By the latter route a bad descent into the valley of the Nile is avoided. The road from the Great Oasis to Esneh or to Rezekat goes from near Bayrees, and thence across the desert to the Nile. The journey is performed in about 50 hours from Bayrees to the Nile. There is also a road from El Khargeh to Rezekat, which occupies the same time, 50 hours, and that distance is computed at about 125 miles.

GSL

30.

CAIRO TO NATRON LAKES AND MONASTERIES.

BY TERANEH.

Territory.	Authority.	Names of Stages.	Distance.			Rivers.	REMARKS.
			Stage.				
			Miles.	Fur.			
					Time.		
EGYPT.		TERANEH ON THE NILE.	35	2	1 day	... ...	Teraneh, on the left bank of the Nile (Rosetta Branch), can be reached either by water or by rail and road, or by road alone. The road from Teraneh to the Natron Lakes runs about due west. At the distance of about 1½ miles from Teraneh it passes over the ruins of an ancient town. The journey across the desert is very monotonous; but at length after crossing an elevation covered with shining black pebbles, the convent of Dayr Macarius is reached. Like all the convents in the Natron valley, it is surrounded by a wall with only a small entrance as protection against the Arabs.
		DAYR MACARIUS	...		...	... ...	
		DAYR SURIANI AND AMBA BISHOI.	...		...	... ...	Three hours' journey from Dayr Macarius is Dayr Suriani, the most beautiful convent of all. A ride of two hours brings the traveller to Dayr Baramoos, a large convent.
		DAYR BARAMOOS	...		...	... ...	
		LAKES ...	37	0	2 days	... ...	About 3½ miles from Dayr Baramoos, near the end of one of the lakes, are a few wattled huts. The whole journey from Teraneh is a ride of about 12 hours. There are several springs of fresh water in the Natron valley, the purest of which are at the convents or monasteries to the south. The Natron valley contains a very small population; the village of Zakook and the four monasteries containing altogether 300 inhabitants. The inmates of the monasteries are Copts. The valley is dreary and barren, producing no vegetables or trees; a few stunted palms and rushes and bulrushes. The animals are gazelle, jerboa, fox. Waterfowl abound. The valley is 22 miles long, and from 2 to 5 wide.

GSL

31

TERANEH TO OASIS OF SIWAH.

BY NATRON VALLEY.

Territory.	Authority.	Names of Stages.	Distance.			Rivers.	REMARKS.
			Stage.				
			Miles.	Fur.			
EGYPT.	HORSE GUARDS ROUTE BOOK.				*Time.*		
		TERANEH ...	...		...	... ...	Left bank of Rosetta Branch (see Route 35).
		NATRON VALLEY	37	0	1 day	... ...	See Route 30. Good water.
		EL MAGHRA ... *or* NADEE-ES-SOOMAR	...		2½ days	... ...	Brackish water.
		EL EBAH ... *or* LIBBAH.	...		1 day	... ...	Salt water.
		EL GARA ...	...		3 days	... ...	Good water.
		TOWN OF SIWAH	...		2 days	... ...	Good water. There is also a route to Siwah from the Fayoum by the Little Oasis, reckoned as ten days from the Fayoum and seven from the Little Oasis. Siwah, or the Oasis of Ammon, consists of two parts, the eastern and western districts; the former the most fertile, and abounding in date trees. According to Browne, it is 6 miles in length, and from 4½ to 5 in breadth. The productions are similar to those of the Little Oasis, but the dates are of very superior quality and highly esteemed. The people are hospitable; but suspicious, savage in their habits and feelings, intolerant and bigoted in religion. The town is divided into an upper and lower district, defended by a citadel built on a rock and surrounded by strong walls. The streets are irregular and narrow, and, from the height of the houses, unusually dark.
					9½ days		

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32.

ALEXANDRIA to OASIS of SIWAH.

BY ABOUSIR.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	St. JOHN—MURRAY.							

(1.) Along the Coast to Mudur and thence to Oasis of Siwah.

The following is taken from Outram's Report, p. 176, giving a description of St. John's tour, 15th September 1847 :—

Left Alexandria and arrived at Abousir, where there was a delay of three days making arrangements. Abousir, a quarantine station, with a Nazir Superintendent, &c. A small hamlet.

18th.—One hour's journey to a well, Bir-en-Neffi. Bivouacked at another well. Total 8¾ miles.*

19th.—Started 4-30 P. M. After a march of seven hours, stopped in a narrow valley near a well called Shemianah, cut in the rock. Water not so bad. Distance 17½ miles.

20th.—Pursued their journey over sand-hills in a direction north-north-west, and bivouacked near the coast and the ruins of the fortress Gobiosa (no water). Distance 20 miles.

21st.—Arrived at the hill on which the Marabout (a tomb,—landmark from the sea) is situated. Well of Shejeek at some distance. Four and a half hours' journey farther on they arrived at Bidyuvrung, where there is a large cistern near a pointed hill. It is dry in summer, but in winter holds good water. Proceeded over some ridges and bivouacked near a dry well called Tamuin. Distance 21¼ miles.

22nd.—Across some high ridges into a burning valley on the coast of the Mediterranean. After four hours reached a square well, cut deep down, and containing an abundant supply of water, which, after drawing the first bucketful, which was good, became so distasteful that the donkeys even seemed little inclined to drink it. After another hour's journey passed near a well of excellent water. An hour further passed another well, called El Tebayeh, of good water. Crossed a range, beyond the traces of a city, called Assambat. Distance 22½ miles.

23rd.—Passed a large patch of gigantic wild sage, and a copse at the mouth of a narrow gorge, in which there is said to be a well called Gosambal. Two hours further found a cistern in the rocks near a marabout on a small eminence. It is said to contain water in the winter season. In an hour and a half more halted on the table-land on which they were travelling (300 or 400 feet high) in sight of the sea. In the neighbourhood was a well called El Gorab. Water reported to be very sweet. Distance 10 miles.

24th.—Moved in an oblique direction towards the sea, descended a coast valley near a well called Gawi, and pursued a difficult road over some ridges, and bivouacked after five hours' ride. No water mentioned. Distance 12½ miles.

25th.—Proceeded over a very difficult road to Mudur, a Bedouin village. Distance 18 miles. From hence the travellers struck off inland to Siwah.

No encampment or human habitation was met between Abousir and Mudur, although no doubt a few were concealed in the recesses of the hills.

(2.) Another Route to Siwah by the Natron Valley.

Murray gives the following route at p. 265 :—

Teraneh, ou the Rosetta branch of the Nile, is the point of departure.

Teraneh. Number of days' journey :—

Natron Valiey (good water), 37 miles	1
El Maghra, or Nadee-es-Soomar (brackish water)	2½
El Ebah, or Libba (salt water)	1
El Gara (good water)	3
Town of Siwah (good water)	2
	9½ days.

There is also a route to Siwah from the Fayoum by the Little Oasis.

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* St. John calculated his rate of travelling at 2½ miles per hour.

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33.

CAIRO TO EL ARISH AND GAZA.

BY BELBEIS AND KANTARA (ON THE MARITIME CANAL).

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	LeMESSURIER—GENL. MacDOUGALL—GENL. BERTRAND—COL. ALDERSON.							At 2½ miles pass the Pasha's palace of Hasswah on right. Skirt the border of the desert to Matarieh, 5½ miles. At 6 miles pass the ancient Heliopolis (granite obelisk). Village of Kafre-i-Gamoos is here, ¾ mile on right, north by east. At 8 miles village of El Marg. At 10 miles pass over the dry bed of the Birket el Haj, at present (December 1850) marked by wells and water-wheels for irrigation to the eastward. At high Nile the water overflows a mile in that direction. At the Birket el Haj the road inclines north by west. At 13½ miles it passes the villages of El Alak and El Zait on the right, east. Road generally firm and good; rather sandy near Heliopolis.
		KANKA ...	14	0	14	0	... ...	Kanka is an old town, partly in ruins, celebrated for the Grand Vizier's victory over the French in 1799. There is a small bazaar. Supplies and water abundant in neighbouring villages. The best camping-ground is near the Military Establishment. There is a small bazaar in the town, but supplies and water are abundantly procured from the neighbouring villages. Road runs north-north-east for nearly 5 miles. At 1½ miles pass old military school. It was established in 1824 by Mehemet Ali, and broken up before 1850. Building is well constructed, and situation remarkably healthy. Would make an excellent barrack for 3,000 men. It is on the borders of the cultivation. To the east the desert lies open; to the west the country is in the highest cultivation. At 4½ miles pass village of Zefanee, ½ mile to left (west). At 5 miles road bends towards east. At 6 miles pass Menáyer, a village situated in the midst of date-groves with much water round it. Water flows to some distance eastward during high Nile; the cultivated lands also extend in that direction. At 6½ miles pass old telegraph station, ¾ mile east, on low sand-hill. At 10½ miles pass village of Zawámel in the midst of gardens and enclosures. From 6½ to 10½ miles the sand-hills are at a varying distance from the road of ¾ to 3 miles. The road continues to skirt the edge of the cultivated lands, passing several villages on the left (west). At 13½ miles skirts a small canal from the Nile (? the sweet-water canal to Suez) and reaches village of Shulieh (a collection of huts). One hundred and fifty yards west is an old semaphore station, eastward of which water

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Territory.	Authority.	Names of Stages.	Distance.				Rivers.	Remarks.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	LeMESSURIER—GENL. MacDOUGALL—GENL. BERTRAND—COL. ALDERSON.	KANKA—contd.	...	...	14	0	... ...	lies in pools and swamps. Half a mile beyond is the desert with low sand-hills. At 14½ miles pass village of Bigleh. At 17¼ enter village of Ezdereebah. At 18½ it reaches Belbeis.
		BELBEIS ...	18	4	32	4	... ...	Belbeis is a station on the Cairo-Zagazig Railway. Belbeis is a place of considerable antiquity. At present (1850) there is little to recommend it. Ruins and mounds, with much water standing in pools, around it. The sweet-water canal passes the town. It takes its rise at Boulak (the port of Cairo), and flows parallel to the road at from 1 to 2 miles distance. To the east of Belbeis is a conspicuous enclosure with some tombs, and beyond is the desert. The road from Suez by the Wadi Jaffia, which leaves the direct road from Suez to Cairo at the central station-house, joins Belbeis from the east-south-east. The desert is open to both north-east and south-east for 4 or 5 miles, and the road is good. The road from El Kanka to Belbeis is good, though sandy from Menayer. Artillery would meet with no difficulty. Camels travel the distance in 7½ hours. The direct desert route from Cairo to El Arish passes 9 or 10 miles to the eastward of Belbeis. There is no water on that route before the sweet-water canal is reached. General Macdougall says:—"The town of Belbeis is almost a fortress in itself if approached through the cultivated land. It is flanked on both sides by canals, and the front is covered by a large water-course extending to these canals on both sides. It is, however, open from the desert (east) side." Road runs north-east, skirting the desert. At 5 miles pass village of Kuffur on left. At 9 miles turn north and cross the Wadi Toumilat, cultivated land. Cross fresh-water canal (60 feet wide, 8 deep) and the Zagazig-Suez Railway near the station of Abou-Ahmed. At 13 miles cross the Wadi Canal and turn north-east, skirting the desert. At 14 miles pass through village of Shekh Nazar. At 22 miles pass Karain. The road runs along the edge of the desert all the way from Shekh Nazar. Water and supplies said to be plentiful between Belbeis and Salahieh.
		SALAHIEH ...	34	0	66	4	... ...	Salahieh is a railway station at the end of the line from Benha *viâ* Abou Keber. It is situated on the plateau which extends from Wadi-el-Toumilat on the south to beyond the cultivated land on the borders of which Salahieh is situated on the north. The elevation of this plateau above the Wadi at Tel-el-Kibeer is from 40 to 60 feet, and the edge of the plateau sweeps round by Ras-el-Wadi, and is found again at a distance of 5¼ miles east of Salahieh in going to Kantara. The range of heights here slopes down from the

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	LeMESSURIER—GENL. MacDOUGALL—GENL. BERTRAND—COL. ALDERSON.	SALAHIEH—contd.	...	...	66	4	... ...	main plateau to a lower plateau composed largely of salt marsh, the height of this range being from 30 to 50 feet above the lower plateau—direction of the range from north-west to south-east. Here is a strong defensive position. It extends to the south-east as far as the eye can see, with a tendency towards due south. The road crosses the desert. On Wyld's map "sweet water" is marked at 8 miles. At 7½ miles the secondary plateau sinks by a step of heights, averaging 30 feet high, into the general plain extending to Kantara. At about 18 miles the road strikes the bank of the Maritime Canal, and then runs due north to Kantara, passing between the canal bank on the right and Lake Menzaleh on the left, thus forming a defile from 100 to 200 yards wide, which might be easily defended at its southern extremity against a very superior force.
		KANTARA ...	20	0	86	4	... ...	Major-General P.L. Macdougall says—"Kantara is of great strategical importance. It is at the highest point of the chain of low sand-hills which interpose between Lake Menzaleh on the north and the small inland lake of Ballah on the south." Kantara is supplied with fresh water from Ismailia. The water is pumped from the fresh-water canal, and passes through a double row of cast-iron pipes. Kantara is 28 miles from Port Said and 21 from Ismailia by the canal. Kantara (in Arabic bridge or ford) is the place at which from time immemorial the road to Syria has crossed the lakes and shoals of the Isthmus of Suez. There is now a ferry across the Maritime Canal here. Width of the canal 325 feet. Road undulates slightly as far as Gūgra, 9 miles. The track is broad and solid, and easy travelling for men, animals, and even carriages. Here is a grove of palms and two wells of surface water. From Gūgra road begins to rise over a range of heights, which extend north as far as the swampy plain of Pelusium and south as far as the eye can see. The road across these hills is 9 miles, though the actual distance to the plain beyond is only 5 as the crow flies. Sand deep all across the range and very distressing to march over. About 9 miles pass Bir-el-Nūs. From Bir-el-Nús a track goes to Farama on sea coast, distant 15 miles. At 18 miles reach the plain. The general character of the range passed over from Gūgra is that of gigantic ridge and furrow, the eastern slopes being very precipitous and the western very long and easy. This range affords three parallel positions of great strength, the crests of which are from 50 to 120 feet above the foot of the eastern

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Territory.	Authority.	Names of Stages.	Distance. Stage. Miles.	Distance. Stage. Fur.	Distance. Total. Miles.	Distance. Total. Fur.	Rivers.	REMARKS.
EGYPT.	LeMessurier—Genl. MacDougall—Genl. Bertrand—Col. Alderson.	Kantara—contd.	...	...	86	4	... ...	slope. An enemy coming from the east to attack either of the three parallel positions must march slowly and painfully down the long western slope in sand nearly ankle-deep, exposed to the guns of the position for at least an hour before he could arrive at the foot of the steep eastern heights, which it would then be impossible for him to scale if opposed ever so weakly on account of the depth of sand. It is impossible to imagine stronger defensive ground, and under the present conditions of fire these positions could almost be held by artillery alone. From the border of the hilly ground a level desert plain extends to Katieh, a distance of 12 miles.
		Katieh ...	30	0	116	4	... ...	Katieh is an oasis in the desert. General Bertrand says (in 1799) there were two wells. Water a little brackish, but drinkable. There were 1,000 palm trees, which could afford shade to 4,000 or 5,000 men. From Katieh to Fort Tineh is 12 miles, and from Katieh to the sea nearly 10 miles. The sands encroach on the oasis on all sides. Colonel LeMessurier says the date-trees are described as being in some instances nearly buried to their upper branches in the drifting sand. LeMessurier says :—"From Katieh to El Arish the distance is stated at 65 miles. The road is good, but the country is all desert. Between these two places water is not often met with, and never in any quantity. At El Arish, however, there is a good supply. Speaking of this road generally, an officer of the Madras Army stated to me that for 95 miles in 100 a light carriage might with ease be driven across it, and that there was no want of water on any part except from Katieh to El Arish. It is the high military road as well as the principal caravan route; all travellers take it. The distance between Cairo and El Arish is computed at 193 miles." (General Bertrand.) "Caravans take 32 hours to journey from Katieh to El Arish. The French army was 3½ days in accomplishing it. On this part of the journey they met with three wells which marked stations, but they were only available for one or two battalions. The first is at Bir-el-Abd (about 17½ miles); the second Birket Aich (Birhet Ees on Keith Johnston's map) (about 37 miles); the third Mecondieh, 57½ miles, situated about 7½ miles short of El Arish." In following this road you are always two to three leagues from the Mediterranean as far as Mecondieh, from whence you journey along the coast. Three leagues north of Bir el-Abd is the mountain of Cassius, between which and the sea is the Lake Sorbonis.
		El Arish ...	65	0	181	4	... ...	El Arish is an oasis much more extensive and more productive than that of Katieh. There are six wells which would provide for the wants of an army of from 15,000 to 20,000,

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Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	LeMESSURIER—GENL. MacDOUGALL—GENL. BERTRAND—COL. ALDERSON.	El Arish—contd.	...	...	181	4	... ...	and there are several thousand palm trees which would give them shade. Lieutenant-Colonel Alderson, in his report, (No. 21, Beirout, 18th July 1841) says, the wells are from 6 to 12 feet from the surface, and some fruit and vegetables are raised by means of irrigation; but all the supplies for the troops as well as the inhabitants are obliged to be sent from Cairo. The town and fort are about 2 miles inland. The bed of the Wadi Gaza north of the town, though dry when visited by Colonel Alderson, showed that in time of rain a considerable quantity of water flows down it.
		Gaza ...	52	4	234	0	... ...	The third part of the desert extends from El Arish to Gaza, 19 leagues. The caravans are 23 and 24 hours *en route.* The French troops were three days in crossing it. French league = 2·42 English miles. Santon de Karout ... ... 4 leagues. Wells of Zawi ... ... 4 „ Wells of Raphia ... ... 4 „ Castle of Khain Tonnes (commencement of Syria) ... ... 2 „ Gaza ... ... 7 „ This latter distance is no longer desert; it is in an intermediate state between desert and cultivation. All along this route you pass at a league or a league and a half from the sea. Raphia is the ruined remains of a large town. A large army (according to Bertrand) requires 12 days to cross the desert of the Isthmus of Suez, counting halts of a day each at Katieh and El Arish. Bertrand goes on to give particulars about forming depôts and magazines at Salahieh, Katieh and El Arish. The problem would, however, be considerably simplified in the present day by making use of the Suez Canal to bring provisions to Kantara, a central position on the road. Napoleon led 14,000 men across the Syrian desert to invade Syria. His transport consisted of 3,000 camels and 3,000 mules. Of these, 2,000 camels were required to carry a three days' supply of water to be renewed at the wells of Katieh and El Arish. 1,000 camels carried 15 days' provisions for 14,000 men and 3,000 horses, and the 3,000 mules carried the baggage.

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34.

CAIRO to EL ARISH.

BY THE DIRECT ROAD.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	HORSE GUARDS REPORT—LINANT'S MAP.	Cairo ...	...	...	...	...	... ...	Leave Cairo in a direction north-east. At 5 miles enter the desert. At 12 miles pass Birket-el-Haj. At 19 miles cross the Derb El Birket El Haj (Route No. 17). At 29 miles cross Wadi Jaffia and road from Belbeis to Suez. At 43 miles cross road from Tel El Kebir to Suez. At 53 miles cross the fresh-water canal and Zagazig-Suez Railway near Mahsama station. At 58 miles reach Nefiche junction of the Cairo-Ismailia and Suez-Ismailia railways, and of the Cairo-Ismailia and Suez-Ismailia sweet-water canals. Nefiche to Ismailia 2 miles.
		Ismailia ... (Distances are measured from M. Linant's map).	60	0	60	0	... ...	For description of Ismailia see pp. lxxxvii & 31. From Ismailia the road appears to cross the Maritime Canal by a ferry, and then turns north along the canal for about 7 miles, after which it strikes north-east across the desert to Katieh.
		Katieh ...	40	0	100	0	... ...	There is also a ferry at El Guiser, about 4 miles north of Ismailia, which offers an alternative road for this short distance. Probably the Maritime Canal may be followed on either or both banks from Ismailia to Kantara, 17 miles, whence the road to El Arish proceeds, as described in Route No. 33. Kantara to El Arish 95 miles.
		El Arish ...	65	0	165	0	... ...	

35.

CAIRO to ALEXANDRIA.

BY LEFT BANK OF ROSETTA BRANCH.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	VARIOUS.							Distances from Murray's Guide much shorter than shewn on Linant's map. See Route 36.
		Boulak ... (Crossing the river to Embabeh.)	1	6	1	6	... ...	Boulak, the port of Cairo. Population in 1833 about 5,000.

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Territory.	Authority.	Names of Stages.	Distance. Stage. Miles.	Distance. Stage. Fur.	Distance. Total. Miles.	Distance. Total. Fur.	Rivers.	REMARKS.
EGYPT.	MURRAY—HORSE GUARDS REPORT—LINANT'S MAP.	Boulak—contd.	...	...	1	6	... ...	Embabeh, formerly a fortified post of the Mamelukes. The battle of the Pyramids fought here, called by the Egyptians "Battle of Embabeh." Embabeh, a railway station. Menache, the railway station nearest the Barrage, is about 8 miles from Embabeh.
		El Gutlah ...	16	4	18	2	... ...	From near El Gutlah, Linant's map shews a desert road along foot of hills and rising to their summits near Teraneh, descending again 35 miles north-west of Teraneh, and continuing in the same direction along eastern shore of Lake Mareotis.
		Beni Salameh	9	0	27	2	... ...	Near Beni Salameh is Wardan railway station.
		Teraneh ...	8	0	35	2	... ...	On left bank. From here a road to Natron Lakes. See Routes 30, 31. Kafr Daond railway station, 1 mile north of Teraneh.
		Algam ...	6	4	41	6	... ...	Seven miles north of Algam is Terriah railway station.
		Zowyet-el-Bahr near Nigeeleh.	9	6	51	4	... ...	Joins route through Delta, low Nile. (See Route 37.) Ten miles north of Zowyet-el-Bahr is the railway crossing the Nile at Kafr Zayat, and about half-way the station of Com Amadeh on the Cairo-Alexandria line. Tel-el-Barood, the junction of this line with that crossing the Delta, is 8½ miles from Com Amadeh, and 10½ miles north-west of Kafr Zayat.
		Damanhour ...	23	4	75	0	... ...	Linant's map shews the road from Nigeeleh to Damanhour as passing through Shibragite, making a bend to the west at that place. The length of this road will be 40 miles. Damanhour on the railway.
		Kerrawee ...	7	4	82	4	... ...	On left bank of canal. Horse Guards Route, quoting Murray, says "crossing the canal" at Kerrawee; but Linant's map gives the road continuous along left bank of canal. Abou Hommos railway station appears to be near Kerrawee.
		Birket Ghuttas	4	4	87	0	... ...	On right bank of canal.
		Karioun ...	3	4	90	4	... ...	On right bank of canal, 5 miles west, is the railway station of Kafr Dawar, close to Lake Mareotis and the Mahmoudieh Canal.
		Es Sid ... *or* Maison Carrée	13	0	103	4	... ...	
		Alexandria ...	5	0	108	4	... ...	

CSL

36.

CAIRO TO ALEXANDRIA.

BY LEFT BANK OF THE NILE.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	CAPT. GELL.	CAIRO ...	...	...	...	...	... ...	Proposed for 10th Hussars, 1855 (Captain Gell). For railway and stations see map and railways. (Sec. XVI.) Across the Nile at Boulak the bridge of pontoons being constructed and fixed from the dockyard, or some adjacent spot. After crossing leave Embabeh on the left; pursue the shortest course to Barrage by the banks of the Nile. *Note by Captain Gell, 14th March 1855.* With regard to the march of the Hussars from Cairo, so much of my plan for their route I found it advisable to alter as refers to the crossing of the Nile at Boulak; the Barrage over the Rosetta branch being now a complete bridge with drawbridges (erected since my first report) at either end. The pontoon bridge has been thrown over the Damietta branch a little below the Barrage of that branch. The Hussars will, therefore, march along the right bank of the Nile as far as the Barrage (15 miles), cross both branches there, encamp on the ground previously selected, and proceed as before intended. *Note, 1877.*—Both branches of the Nile are now bridged at the Barrage, but the bridges lie within the fortress. (See Barrage.)
		BARRAGE ...	12	0	12	0	... ...	Here halt for 1st camp close to the Nile. Then taking an embankment which runs westerly to the village of Nikli, before which, at the termination of the embankment, a canal has to be crossed, which we forded, camels and men without any difficulty (it is 2½ feet deep, muddy bottom, but the sides not steep). From Nikli the road proceeds between fields, and is narrow to Gurgair, a few hundred yards from which the desert commences. About 4 miles of drifting sand in hillocks, heavy for cavalry, and very much so for infantry, brought us to Galta.
		GALTA (GUTLAH)	10	0	22	0	... ...	Second halt. A small village containing about 350 inhabitants, ¾ mile from the banks of the Nile. In it two wells; but supplies must be brought from Cairo. The whole of the road from Galta to next halting place, Beneh Salameh, is through heavy sand-hills. We made a straight cut from one village to another.
		BENEH SALAMEH	9	0	31	0	... ...	Third halt. Here halt one day. About 600 inhabitants, surrounded on all sidesb y sand. The Nile flows under the walls of the village. The road now pursues the course of the Nile for 2 miles to the entrance of the Kitadhelo

CSL

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	CAPT. GELL.	BENEH SALAMEH —contd.	...	...	31	0	... ...	canal, which is not bridged. We proceeded up the western bank as far as opposite Aboo Kagal (which is on the other side of the canal), when we crossed by a stone bridge which is out of repair but not dangerous to the next halting place, which is about a mile to the north-east on the banks of the Nile.
		MISHLEH ...	13	0	44	0	... ...	Fourth halt. A village of 600 inhabitants surrounded by cultivation and near the Nile. Leaving this we turned towards the embankment of the Ketuleh canal, and proceeded along its eastern bank as far as a bridge opposite Kafr Boulin. The road alongside this canal is not good, wide enough for not more than two mounted men abreast. It is on top of the embankment. As far as Kafr Boulin water is procurable at all times of the year from the Nile, and generally from the canal.
		KAFR BOULIN...	14	0	58	0	... ...	Fifth halt. A village of some importance. Forage and grain procurable in large quantities, and at this time of the year (December ?) clover. Surrounded by irrigated cultivated land. Water-carriage for baggage and stores is available to this place by the Nile to Beneh Salameh and the canal from thence. From this place the road takes a north-north-west direction, leaving both the canal and the Nile; consequently camels will be required as far as Damanhour, where the road meets the railway. The road here and there very fair, passing over uncultivated heaths, narrower through the cultivation, crossing several small canals, and all bridged as in Sinde. Sick-carriage must proceed up the Nile as far as Kafr Zayat, where the rail is available. *Note.*—Ten miles north of Kafr Boulin is Kafr Zayat; the road apparently along left bank of canal. Here troops by land and also stores and sick by the Nile, or by the canal, would reach the railway at this important point together. The canal, with the road on left bank, runs on 14 miles to Shibragite on the Nile (Route 35), and then turns west 15 miles to Damanhour, again meeting the railway there.
		GABARIS ...	15	0	73	0	... ...	Sixth halt. A village of 600 inhabitants in the midst of cultivation. Supplies and forage procurable in large quantities. Water is good. Hence to Damanhour the road is principally through cultivation for 11 miles, joining the railway at Debelal, alongside of which troops can march to Damanhour.
		DAMANHOUR ...	15	0	88	0	... ...	Seventh halt. Here halt one day. A place of some importance. Supplies easily procurable. Water all the year round from the Mahmoudieh Canal. From Alexandria to the Nile, the railway runs on an embankment. The single line of rails occupies only one-third of the width of em-

CSL

Territory.	Authority.	Names of Stages.	DISTANCE.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	CAPT. GELL.	DAMANHOUR—contd.	...	...	88	0		bankment. On each side are canals, 20 feet wide, formed by the excavation. On the north side is a raised road 12 feet wide outside the canal, constructed for travellers to Tantah and Bennah. From Damanhour the road proceeds by the side of the rail to Kafr Dowar.
		KAFR DOWAR ...	20	0	108	0	... ...	Eighth halt. A small village north of the line. Considerable cultivation. Grain and straw easily procurable, also clover. The embankment road across Lake Mareotis is apparently doubtful, owing to narrowness of embankment and damage by inundations. It was necessary for Captain Gell to proceed by the towing-path of Mahmoudieh Canal, which was bad in parts, and dangerous in wet weather.
		ALEXANDRIA ...	24	0	132	0	... ...	"In Alexandria the ground shewn to me for encamping the Hussars is in rear of the Gatury Palace, close to the termination of Mahmoudieh Canal, enclosed by a wall containing two fine wells of considerable extent, good holding ground for pickets, and dry. It is also close to a convenient jetty for embarkation. Another spot was also suggested on the other side of the harbour, also close to a jetty." *The above route appears to have been adopted by 10th Hussars.* *General remarks.*—Except at Beneh Salameh, where the ground is sandy, all the camping grounds are damp, and must be fixed among the cultivation, a great part of which is clover. The common food for horses in Egypt is barley and chopped wheat-straw. To avoid surfeit and skin diseases, horses are picketed in the clover fields for a month once a year, and take another month to condition. My experience contradicts what I have heard of their power of endurance; 35 or 40 miles being sufficient to make them unserviceable the following day. The price of young sound horses is from £7 to £20.

Two other routes were proposed for 10th Hussars from Cairo to Alexandria, 1855 (Colonel Campbell, Quarter Master General):

1st.—From Cairo along the railway embankment on the right bank as far as Benha-el-Assal, where the Damietta branch has to be crossed; thence still by the railway embankment to Birket-el-Saba, on the left bank of the Chibin Canal, formerly a branch of the Nile, now dry in the hot season; thence by Tantah and Kafr Zayat, on the right bank of the Rosetta branch, and crossing there by the line of the railway by Damanhour to Alexandria.

The advantages of this route were that the road is excellent, being sufficiently wide as far as Kafr Zayat for eight horses abreast; and although more circuitous than the Kafr Boulin road (detailed above), it is a straight line from point to point.

The disadvantages were that there were three river crossings—Damietta branch, 400 yards; Chibin Canal, 80 yards; Rosetta branch, 550 yards,—and that all the camping grounds would be very wet.

Note.—Now (1877) both branches of the Nile are bridged at Benha and Kafr Zayat for the railway.

2nd.—Proposed by Suliman Pacha, a Frenchman and Commandant of the Egyptian forces. To take the right bank of the Nile as far as the Barrage, then cross the Damietta branch and follow right bank of Rosetta branch as far as opposite the commencement of Kitadhelo

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	Remarks.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	CAPT. GELL.							Canal, 2 miles north of Beneh Salameh, crossing the Rosetta branch there, and proceeding by Damanhour, as detailed in Route 36. The advantages were that the desert between Gurgair and Beneh Salameh would be avoided. But the difficulties to be encountered in this 21 miles of desert exist more in name than in reality. The heaviness of the sand matters little when the distance is divided into two short marches, when there is no want of water at the halting places, when camels find increased travelling, and when water-carriage is available. The disadvantages, that there were two river crossings of 500 yards each. The means of effecting the crossings were a pontoon bridge and ferry boats. The pontoons were Blanshard's; and though efficiently organised with a battalion of pioneers, on the occasion of a grand parade, Suliman Pacha failed to throw it across the Nile at Cairo, although assisted by a steamer. Ferry boats were not numerous, and would have to be collected from considerable distances. When Captain Gell crossed at Cairo, although towed by a steamer, the passage took an hour. Boats pass the Barrage with difficulty, and the yearly loss even of single boats there is very great. The force of the current there is great; in other parts of the Nile about 3 miles per hour. The ferry boats would hold from 8 to 10 horses. Proposals were made to use the Nile steamers towing river boats. On enquiry the available number of steamers was insufficient, and being long narrow boats full of hatchways, they were ill-adapted for carrying horses. The steamer takes 5 hours from Cairo to Kafr Zayat, and 11 hours to return. The river boats being half decked, would accommodate 4 or 5 horses with difficulty. Sailing, and with the northerly wind prevalent in Egypt, these boats would take four days from Cairo to Kafr Zayat, and two more to Alexandria by the Mahmoudieh Canal. It appeared therefore desirable in every way that cavalry should march the whole distance, and by the route detailed (36). But for infantry the most feasible way appeared to be by steamer to Kafr Zayat, and railway thence to Alexandria. Most of the steamers would accommodate 300 men. The time from Cairo to Alexandria by this method would be 24 hours.

37.

CAIRO TO ALEXANDRIA.

THROUGH THE DELTA TO ZOWYET EL BAHR (LOW NILE).

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	Remarks.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	MURRAY—LINANT'S MAP—HORSE GUARDS REPORT.	CAIRO ... (*North-west gate.*)	...	...	...	...	... ...	Distances from Murray's Guide, and much shorter than shown on Linant's map. Leave Cairo by north-west gate. Road passes through a shady avenue of acacia trees to the palace and gardens of Shubra on the Nile. The river is at some distance to left (or west), having forsaken its ancient channel, which may still be traced. Pass through the village of Shubra, called Shubra-el-Makáseh to distinguish it from another village of same name, Shubra Shabeeyeh, 14 miles lower down the river. The gardens of the palace are pretty, though formal, and contain some large acacia trees and a handsome fountain. Near the palace is a kiosk, called El Jebal, or the hill. You ascend to it by flights of steps on two sides. It commands a view over the Nile and hills in the distance.
		SHUBRA-EL-MAKASEH. (*The Pasha's Villa.*)	4	0	...	...	... ...	

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Territory.	Authority.	Names of Stages.	Distance. Stage. Miles.	Distance. Stage. Fur.	Distance. Total. Miles.	Distance. Total. Fur.	Rivers.	REMARKS.
EGYPT.	MURRAY—LINANT'S MAP—HORSE GUARDS REPORT.	SHUBRA SHABEEYEH.	13	4	17	4	.. ...	Right bank of Damietta branch. Cross to Kafr-el-Hemmeh. The Damietta branch is from 230 to 270 yards broad (Horse Guards Report), 400 yards at Benha-el-Assal. See Route 36.
		MENOUF ...	18	0	35	4	... ...	Noted for a manufacture of mats.
		ZOWYET EL BAHR.	18	4	54	0	... ...	Left bank of Rosetta branch, which has to be crossed. This branch from 460 to 690 yards wide (H. G. R.), 550 yards at Kafr Zayat. See Route 36.
		ALEXANDRIA ...	57	0	111	0	... ...	From Zowyet-el-Bahr. See Route 35.

38.

ALEXANDRIA TO CAIRO.

BY LEFT BANK (LOW NILE).

The French in 1798 started from Alexandria in July and marched to Cairo by the following routes. At this time of year the river would be at its lowest. They marched in two columns. (For detail, see p. xxv.)

Distances measured from Horse Guards Route Book and Linant's map.

March of the right column (main body).

Territory.	Authority.	Names of Stages.	Distance. Stage. Miles.	Distance. Stage. Fur.	Distance. Total. Miles.	Distance. Total. Fur.	Rivers.	REMARKS.
EGYPT.	HORSE GUARDS ROUTE BOOK.	ALEXANDRIA ...	...	...	...	...	... ...	July 7th.
		DAMANHOUR ...	33	4	33	4	... ...	Marched by Alexandria-Mahmoudieh Canal.
		RAMANIEH ...	13	0	46	4	... ...	July 10th. Left bank of Rosetta branch.
		MINIEH ...	3	0	49	4	... ...	July 12th. Advancing by left bank.
		SHABOUR ...	20	0	69	4	... ...	July 13th. (Action of Shibragite.)
		COMSHERIF ...	12	0	81	4	... ...	July 14th.
		ALGAM ...	10	4	92	0	... ...	July 15th.
		ABOU NECHABEH	13	4	105	4	... ...	July 16th.
		VERDAM ...	8	0	113	4	... ...	July 17th.
		FORK OF THE DELTA.	15	0	128	4	... ...	July 19th. Halted 20th. Battle of the Pyramids, 21st.

GSL

Territory.	Authority.	Names of Stages.	Distance. Stage. Miles.	Distance. Stage. Fur.	Distance. Total. Miles.	Distance. Total. Fur.	Rivers.	REMARKS.
EGYPT.	HORSE GUARDS ROUTE BOOK.	*March of the left column.*						
		Alexandria ...	...	...	...	...	... ...	July 5th.
		Rosetta ...	44	6	44	6	... ...	July 6th.
		Ramanieh ...	33	0	77	6	... ...	July 12th. (By left bank, joined main body.)
		Fork of the Delta.	95	0	172	6	... ...	See above route of right column.

39.

ALEXANDRIA to CAIRO.

by LEFT BANK (LOW NILE) and DELTA.

The English army in 1801 started from Alexandria and marched to Cairo, it being low Nile at that time of the year. The force marched all the way in two columns. For details, see p. xxxi. Distances measured from Horse Guards Route Book and Linant's map.

March of the right column.

Territory.	Authority.	Names of Stages.	Distance. Stage. Miles.	Distance. Stage. Fur.	Distance. Total. Miles.	Distance. Total. Fur.	Rivers.	REMARKS.
EGYPT.	HORSE GUARDS ROUTE BOOK.	Ramanieh ...	46	4	46	4	... ...	May 9th and 10th. Left bank of Rosetta branch. Action of Ramanieh.
		Shibragite ...	5	0	51	4	... ...	May 11th. Advancing by left bank.
		Kafr Hondieg	8	0	59	4	... ...	May 12th.
		Shabour ...	10	0	69	4	... ...	May 14th. Between Shabour and Kafr Lahe-isse.
		Zowaff ...	10	0	79	4	... ...	May 15th.
		Algam ...	12	0	91	4	... ...	May 16th.
		Mischlei ...	4	0	95	4	... ...	June 1st.
		Lochmas ...	9	0	104	4	... ...	June 4th.
		Verdam ...	9	0	113	4	... ...	June 5th.
		Burtos ...	20	0	133	4	... ...	June 9th.
		Finesh ...	6	0	139	4	... ...	June 15th.
		Shubra (*Opposite*). ...	4	0	143	4	... ...	June 16th.
		Near Ghizeh ...	7	0	150	4	... ...	June 21st. Investment of Cairo.

March of the left column.

The advance of the left column was by the following route. Colonel Stewart was encamped at El Hamed on the left bank near Rosetta.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	HORSE GUARDS ROUTE BOOK.	Rosetta ...	44	6	44	6	... ...	See Route No. 43.
		El Hamed ...	5	0	49	6	... ...	May 4th. Crossed to right bank of Rosetta branch.
		Between Sindim and Fona.	14	0	63	6	... ...	May 6th.
		Serafa ...	4	0	67	6	... ...	May 8th.
		Dousong (Dessonk).	5	0	72	6	... ...	May 9th. Action of Ramanieh.
		Between Saafie and Mahallet Dye.	6	0	78	6	... ...	May 11th.
		Position on Canal of Ferasiak.	8	0	86	6	... ...	May 12th.
		Benoufar ...	6	0	92	6	... ...	May 14th.
		Lacra ...	10	0	102	6	... ...	Ditto.
		Nadir ...	10	0	112	6	... ...	May 16th.
		Menouf ...	5	0	117	6	... ...	May 18th. Now following the Menouf Canal.
		Birchamps ...	8	0	125	6	... ...	May 21st.
		Shubra Shaabi	12	0	137	6	... ...	June 5th. Joined the Vizier.
		Charlahan ...	5	0	142	6	... ...	June 14th.
		Bason (Bessous). ...	5	0	147	6	... ...	June 15th.
		Shubra ...	5	0	152	6	... ...	June 16th.
		Cairo ...	4	0	156	6	... ...	See Route 37.

CSL

40.

CAIRO TO DAMIETTA.

BY WATER.

Territory.	Authority.	Names of Stages.	Distance. Stage. Miles.	Distance. Stage. Fur.	Distance. Total. Miles.	Distance. Total. Fur.	Rivers.	REMARKS.
EGYPT.	MURRAY.							It is probable that communications by land on one or both banks of Damietta branch exist, but no information is available. Linant says: "On the banks of the river and of the large canals there are strong dykes which are at all seasons the best lines of communication."
		BERSHOOM ...	25	0	25	0	... ...	On east bank, famous for figs.
		BENHA-EL-ASSAL	20	0	45	0	... ...	To the north of this town is the entrance to the Toorat Moez, or canal of Moez, which takes the water to Zagazig, and thence to Lake Menzaleh by the old Tanitic channel, and to Suez by the sweet-water canal. The Toorat Moez is about 150 feet broad, navigable at all times of the year for large boats, and abounds in fish.
		ZIFTEH AND MIT GHUMR.	25	4	70	4	... ...	On east and west banks.
		SEMRNOOD ...	26	0	96	4	... ...	On west bank. A place of some size, with the usual bazaars, famous for pottery.
		MENSOORA ...	13	0	109	4	... ...	On east bank. One of the largest and most flourishing towns in the Delta, with bazaars, mosques, and a Government palace.
		SHIRIBIN ...	22	0	131	4	... ...	On west bank.
		FARASKOOR ...	22	0	153	4	... ...	On east bank.
		DAMIETTA ...	12	0	165	4	... ...	On east bank.

41.

DAMIETTA TO SUEZ OR CAIRO.

BY MENZALEH, SALAHIEH.

Territory.	Authority.	Names of Stages.	Distance. Stage. Miles.	Distance. Stage. Fur.	Distance. Total. Miles.	Distance. Total. Fur.	Rivers.	REMARKS.
EGYPT.								From Damietta embark in boats on Lake Menzaleh. The passage occupies 4 hours. The landing place at Menzaleh is 1 mile north of the town in the new canal.

GSL

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	MURRAY—LINANT.	Menzaleh ...	20	0	20	0	... ...	In March, April, and May Menzaleh may be avoided by following the Damietta branch to Sherbeen (Chirbine on the railway), and thence by the villages of El Nosara and El Mameh to San. This route would be about 50 miles.
		San ...	15	0	35	0	... ...	From Menzaleh to San is 10 to 15 miles. The road is over ground overflowed by the lake at high Nile, and a detour to the right or west is necessary according to the state of the country. This must be determined on the spot; but the route is invariably through the cultivated districts, where supplies and water are abundant. Numerous canals intersect these districts, but at the principal ones there are ferries, and the others are generally bridged, but sappers should always accompany artillery in this or any route through the cultivated districts of the Nile. *N. B.*—The season for military operations in Lower Egypt is from the end of February to the end of July; during the rest of the year the inundation and its effects render the roads generally impracticable for artillery. On the canal of Moez there are numerous towns and villages, and the canal may be crossed near any of them, where boats are usually found.
		Salahieh ...	20	0	55	0	... ...	From San to Salahieh is 20 miles, the direction of the road depending on the state of the country. From Salahieh to "Belbeis and Cairo see route 33, distance" 66½ miles. From Salahieh to Tel-el-Wadi the direct road called Sireh-el-Borain passes over the desert; it is firm and gravelly. One well called Bir Dogh.
		Tel El Wadi ...	16	0	71	0	... ...	From Tel-el-Wadi to Suez, see Route No. 21, distance 80¾ miles.
		Suez ...	80	6	151	6	... ...	

CSL

42.

ALEXANDRIA TO DERNA.

BY COAST ROUTE.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	SIR JAMES OUTRAM.							This is taken from Outram's Report, page 169, which is taken from M. Pacho's Narrative. M. Pacho left Alexandria, 3rd November 1824. Three hours after departure reached Marabout. Continued the journey between Lake Mareotis and the sea-shore, and arrived at Abousir. *8th.*—Travelled to Baurdin, a well-situated town, six hours west of Abousir. *9th.*—Encamped at Samaid, a Saracen castle, six hours. *10th.*—Halted. *11th.*—Reached Dresich, the ruins of an ancient city near the sea. There is a lake of salt water near. *12th.*—Arrived at Muktari, seven hours. *13th.*—At half-an-hour's distance from Muktari passed near Benaiah. Above Selim the ruins of a quadrangular enclosure containing a well. Seven hours further on arrived at Djarmnerneh. Two hours north of Djarmnerneh, and near the cape formed by the extremity of the Arab bay there are several wells. Numerous vestiges of ancient villages, reservoirs for receiving rain water, and canals for conducting it. *14th.*—Crossed the mountains of Pentapolis. Encamped near a torrent formed by the rain water. Both banks of the torrent were covered with Arab encampments. *15th.*—Crossed another chain of heights called Mendah-el-Medah, running north-north-west by south-south-east. Proceeded to Berek, a small port, and on 17th, after three and a half hours' journey towards the west, arrived at Boun Adjoubah, a fertile valley, with palm trees, and ten wells, each 20 metres deep, containing excellent water. The road for sixteen hours was over clayey soil mixed with sand, which gives it a yellowish colour. *18th.*—Arrived at Chammis, a Saracen castle. *19th, 20th,* and *21st.*—Detained. *23rd.*—Passed near Kasi Ladjadubich, twenty-four hours from Chammis. The road, after passing a small well of excellent water, led over the Akaba-el-Solom, a mountain (900 feet high), then along an extensive table-land, which they left at Bien Zemleh, and entered the valley of Dafneh. *26th* and *27th.*—Journeyed for nine hours in the valley of Dafneh, the axis of which lies in the direction north-north-west. *30th.*—Passed Ain-el-Ghazel, and six hours further on the valley of Ternünch, where water is abundant during the greater part of the year. They then crossed a lagoon formed by the Gulf of Bomboa, and passed over the heights of the ancient Lybian Pentapolis, where there was vegetation and water, reaching Derna eventually, but on what date is not stated. *N. B.* (*by Outram*).—"The author appears to have suffered no inconvenience from deficiency of water during this journey, as no mention is made of ever being in want." This may be owing to the season at which he travelled (November and December), when the rains prevail. Derna is composed of five villages, one of which is fortified.

CSL

43.

ALEXANDRIA TO DAMIETTA AND PORT SAID.

BY ABOUKIR AND ROSETTA.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	HORSE GUARDS REPORT.	ALEXANDRIA ... (ROSETTA GATE).	...	...	...	...	... ...	To Rosetta the road is good but sandy; very heavy in a few places only, but practicable the whole way for artillery. Fresh water is to be found at wells at intervals of 2 or 3 miles. The road issues from Alexandria by the Rosetta Gate, and running for ½ a mile east by south over the mounds of the ancient city, crosses the old wall on which the French lines were raised. It passes the new entrenched line at Tibia-el-Nishan, and descends into a plain first cultivated by order of Ibrahim Pacha.
		CÆSAR'S CAMP...	2	4	2	4	... ...	This Roman station is situated on a hill, and is nearly square, measuring 291 paces by 266 inside. The walls are 5 to 5½ paces thick. Here an action was fought between Augustus and Antony, and in 1801 between the French and English, when the camp formed the right of the British position, 21st March 1801 (fronted towards Alexandria). Along the foot of the position towards the town is cut a trench by which at any time the water of the Mahmoudieh canal might be carried to the sea. *Note.*—The last paragraph (from *Horse Gds. Rt.*) is not substantiated by Linant's map. The latter shews the cut close to north-east face of Alexandria, and connecting the canal and new harbour. The heights of the British position gradually slope to the canal, ¾ mile south. Passing on, the road runs through groves of date trees, the country to the south, towards the Mahmoudieh Canal, being a salt, sandy plain, passable in most places for cavalry, and on which a mirage is generally seen.
		RAMLEH ... (Ry. Station.)	1	6	4	2	... ...	At 3¼ miles pass a well of fresh water. At 4¼ miles the road passes Ramleh, where there are country residences of the Alexandrians. From Ramleh the road inclines to the south for ½ a mile to avoid the sand-hills, and at 5½ miles from the Rosetta Gate enters the dry bed of Lake Aboukir. The country to the south is the dry and level bed of that lake; to the north a belt of sand-hills divides it from the sea. These sand-hills extend to Aboukir, and run in low ridges, being in some places deep; they are covered with date-trees.
		MANDARA ...	5	2	9	4	... ...	At 9½ miles from Rosetta Gate the village of Mandara is passed; it is 1,700 or 1,800 yards to the north. There are several wells of good water.

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Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	HORSE GUARDS REPORT.	MANDARA—contd.	...	...	9	4	... ...	Horse Guards Route says:—The village of Mandara is a short distance from the high road on the sea-coast in the Bay of Canopus, about 3½ miles from Cæsar's camp. At ⅛ of a mile north of Mandara the telegraph station of Isharahel Mandara rises 70 feet over the sea, and 500 yards south-east is a martello tower commanding a small bay, in which small boats land. Sir R. Abercrombie's army advanced by the line of this tower and the village of Mandara to his position at Cæsar's camp. Country sandy, but sand-hills and date-groves afford good shelter. The artillery was dragged over this ground. Lake Aboukir was at that time full, but its dry bed might now be used. About 2½ miles from Mandara a road branches to north-east and leads to Aboukir. This village is a mere collection of huts, with several wells of good water, and is 14 miles from Alexandria.
		ABOUKIR ... (Ry. Station.)	5	4	15	0	... ...	On the promontory which forms the north-west shoulder of the Bay of Aboukir are two forts of considerable size and strength, connected by a covered way 550 yards long. One hundred yards south-east is a third on an eminence 60 feet high. This latter was the centre of the French position, 1801, but was not then fortified. These three forts flank one another, and command the approaches from the west, north, and east. At 1,200 yards north by west from the latter fort are the ruins of Canopus. They cover some extent of ground, and would afford good cover from the forts. The road from Aboukir to Rosetta after the first 6 miles skirts the sea-line, the firmest ground being at high-water mark. It is over a heavy sandy plain, marked by 13 pillars at regular intervals, and connects the various forts and martello towers which defend Aboukir Bay. On leaving Aboukir the road passes under the mound on which one of the forts stands, and proceeding by the sea-shore for 1,500 yards it inclines to the south and enters on the bed of Lake Aboukir. At about 500 yards farther it passes the first of a series of fine martello towers which protect this coast, and proceeding east about 2 miles, three other towers are passed in succession. They are all of the same construction, *viz.*, a square fort of about 75 yards side, with ditch and draw-bridge and a round tower in the centre; the guns on the sea faces are nearly *a fleur d'eau*. Each fort mounts 10 guns and one on the tower. These forts are not placed equidistant, but flank one another, and command the bay and land side. At 600 yards beyond the last tower, the road leaves the bed of the lake and the direct road from Alexandria to Rosetta, which, instead of turning towards Aboukir, proceeds east across the bed of lake Aboukir, and joins the Aboukir road at this place, and then skirts the sea-shore for 3 miles to avoid

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Territory.	Authority.	Names of Stages.	DISTANCE.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	HORSE GUARDS REPORT.	ABOUKIR—contd.	...	...	15	0	... ...	lake Edkoo, and reaches the embouchure of that lake called the *Maodee* or ferry. Here is the fifth and last of the martello tower forts; it differs from the foregoing and is larger; it could mount 15 guns, and commands the ferry, part of the lake, and the approaches from the westward. There is a telegraph station 200 yards south of it with a small well of water; supply very limited. Beyond this again 300 yards is an old field-work commanding the lake. The sands have partially accumulated at this place, and extend a short distance to the south and west. The distance by foregoing road is about 7½ miles from Aboukir.
		MADEEAH ... (Ry. Station).	7	4	22	4	... ...	A few miles to the eastward of Aboukir, according to Murray, is an opening called Madeeah, "the ford or ferry," by which the lake Edkoo communicates with the sea. According to the most recent Admiralty chart, however, the Edkoo Boghaz is now closed, and the lake almost dried up.
		EDKOO ... (Ry. Station.)	6	0	28	4	... ...	The only village on the northern side of the lake is Edkoo, which is strongly situated among the hills and date-groves, about 5½ to 6 miles to the east of the "*maodee*" and 2,000 yards from coast. The turning to this village is marked by a Shekh's tomb, 300 yards south of the road, near which there is a well of good water. There are several wells of good water in the neighbourhood of Edkoo. From the Shekh's tomb the road skirts the sea for 4½ to 5 miles, then turns east-north-east towards Rosetta, and passes over a deep and sandy plain 4½ to 5 miles long, marked with small brick pillars; then for 2 miles between the sand-hills through a date-grove, which covers the northern and western face of Rosetta. The sand is deep and shifting, and in 1850 *covered the walls*, which are 15 feet high. The total distance from Alexandria *viâ* Aboukir to Rosetta is about 42 miles; by the direct road it is about 38. The road by the sea-shore is deep and heavy, but practicable for artillery. In some places double teams would be necessary.
		ROSETTA ... (Ry. Terminus.)	14	4	43	0	... ...	Rosetta is situated on the left or western bank of the Nile, 7 miles from its embouchure. It is a walled town and partly fortified. Its length north and south is about 1,800 yards, and breadth about 1,300. Its population and trade have dwindled in the same proportion as those of Alexandria have increased. Its houses are in ruins, and the accumulation of sand is increasing. On the river banks, however, there is busy life, and boats, both river and sea-going, are found here in considerable numbers, and some as large as 150 to 200 tons. Rice is plentifully grown in the neighbourhood. Supplies are not scarce, and dates are abundant. There are extensive barracks on

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Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	HORSE GUARDS REPORT.	ROSETTA—contd.	...	...	43	0	... ...	the north side of the town on the river ban About 1,500 infantry are now stationed her but no artillery (June 1850). Water-carria in abundance, but camels, mules and donke are scarce. The navigation of the river i unimpeded both up and down stream. Atfe the entrance of the Alexandria or Mahmoudieh canal, is distant about 23 miles. Sailin vessels take ten and twelve hours, and steame three and four hours, to accomplish this distance. For Routes Rosetta—Cairo, see Routes 3 39. The line of communication between t Rosetta and Damietta branches of the riv is either by the coast road, 93 to 95 miles (' by Linant), of which description follows; or a considerable detour inland (*viâ* Beninb Fonah, Belcasse, apparently about 100 mi from Linant's map); or by Lake Brulos fr the village of Roos, 2½ miles east of Rose to Beltine, and thence by the following rou but no troops could *possibly march* fr Rosetta to Damietta under three and a h to four days *by any roads*. The road by the sea-shore is about 93 m long, and with the exception of about miles to the eastward of the Boghaz mouth) of Lake Brulos, it is all barren desolate. The road skirts the sea at water's edge. To the south the sand-hills from 2 to 3 miles distant; they are low shifting and devoid of all vegetation. continuity of their line is here and th broken by the inroads of the sea during v ter, and the overflowings of the lake du high Nile. On leaving Rosetta the Nile is crossed from centre of the town by the principal ferr the opposite or right bank at Esbek el Mao Thence the road follows the river for ¾ m it then turns to north-north-east, and cro the bed of a salt marsh (which is overflo in winter) to the sea. This marsh is 5 m long, and very heavy. The road at the s coast turns east by north, and from this poi skirts uninterruptedly the high water-ma to the Boghaz of Lake Brulos. At about 1 miles Linant's map shows Mastarawadi (nan almost illegible), where sweet water is note At about 30 miles some date-trees to south ma a well of brackish water, and about 2½ mil other wells of a better description call "Zerreh el Hanafik Genneh el," and so melon grounds are seen 400 yards in the san direction. The lake is 1,200 yards dista from the shore.
		BOGHAZ OF LAKE BOURLOS (BRULOS.)	38	0	81	0	... ...	The ferry of boats at the Boghaz is 120 yar broad at the narrowest part, and is here 8 t 10 feet deep. Near the bar it is 230 yard wide with 2½ to 3 feet. A surf beats in over the bar even in summer. On the eastern side of the ferry is the Governor's house, a larg brick building with a mosque near it. Directl

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	HORSE GUARDS REPORT.	BOGHAZ OF LAKE BOURLOS (BRULOS)—contd.	...	...	81	0	... ...	opposite the ferry is the quarantine station, and about 200 yards further to the south some houses mark the landing place and the customs-house. The only place of defence here is the Fort of Brulos, an old square tower of brick and stone, and 35 to 40 yards square, built by the French in 1799, and now (1850) under repair. This tower is about 250 yards from the sea, 400 from the ferry and 150 from the lake. There are no wells in it, but water is kept in large reservoirs, which are filled during the inundation.
		BELTEEM ...	6	4	87	4	... ...	Proceeding east for 6½ miles, the road passes the village of Belteem. The lake is on the right a few yards, and on the left low sand-hills covered with date-trees are 200 to 300 yards distant. Some huts are interspersed in the groves, having generally small wells of water near them. The best drinking water is from a well 1¼ miles east of the ferry. The village Belteem is of red brick and substantially built; it is situated on a slight eminence close to the lake; its population is about 500. The population of the district is about 1,500. The lands about Belteem are cultivated to some extent, and irrigated by canals from the lake. There is some good pasture for goats, sheep, and cattle. Sand-hills commence at Brulos ferry, and sweep round to the east at Ras el Brulos north of Belteem. Boats navigate Lake Brulos at all seasons, and there is no failure of water. The usual mode of intercourse with Rosetta is by boat, especially during winter, when the coast road is frequently impassable and generally dangerous. The landing place near Rosetta is near the village of Rous, 2 miles to the east up the Rosetta branch of the Nile. Leaving the village of Belteem the road passes through the date-grove, and enters in a plain marked by a conspicuous tomb called Shekh Hamaydee, amidst patches of cultivation.
		HAMAYDEE ...	6	0	93	4	... ...	At 6 miles from Belteem the road passes the village of Hamaydee, which is a mere collection of huts; there are some wells of good water here. Population 150. From the village of Hamaydee the road skirts the date-grove, which inclines to the south-east and ceases altogether about 5 miles in that direction. At 2½ to 3 miles east from Hamaydee the road passes a few deserted huts, and inclines to north by east to regain the sea-shore, which is 5 miles from the village, 3 of which are over deep and heavy sand; thence for 22 miles it skirts the high water-mark, the sands are continuously heavy, and the desert around complete and unbroken by a shrub or bush. Linant's map shows a road south-east from Belteem across the desert to Sette Gumiane, a celebrated Coptic convent near Belcasse, thence to the Damietta branch near Farescor, and thence 10 miles north along the Damietta branch to Damietta.

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Territory.	Authority.	Names of Stages.	Distance.				Rivers.	Remarks.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	HORSE GUARDS REPORT.	El Astoo Jummosa.	27	0	120	4	... ...	At 27 miles from Hamaydee the road crosse the canal of El Astoo Jummosa, which flow from lake Brulos. It is 50 yards wide and 2 2½ feet deep near the sea; higher up it is muc deeper. It is salt in June, but during hig Nile it becomes sweet. There is a small vil- lage about half a mile to the right of the road. *Note.*—This canal is shewn is Linant's map as the outlet of various canals from the Damietta branch, but having no direct communication with lake Brulos.
		Damietta ...	14	0	134	4	... ...	Leaving the canal and proceeding east by the sea-shore, the road at 6½ miles turns to th south-south-east to Damietta, distant 7 mile from this point, and enters on the dry bed o a salt marsh, which in winter is overflowed b the sea; the ground is tolerably firm for fo travellers, but laden mules sink 2 inches int the sand; the water lies from 2 to 3 feet ove it in winter, but men and animals pass ov it, keeping to a known track. From half-w across this marsh a road crosses from th western Boghaz fort to Kafr-i-Buttuk, a v lage 2 miles to the south on the Nile, and abo 4 miles above Damietta. This road is ov deep sands, and only travelled by fisherme The marsh is about 4 miles across. At miles from the sea-shore the road passes well of brackish water and some melon- grounds, and at 2 miles further it reaches the village of Seneneeyah at the suburbs of Damietta. There is a date-grove about this village, abo mile broad east and west, and extending some miles up and down the river. ground is undulating and intersected by wa cuts. Infantry could find good cover in t grove, but artillery would be delayed witho some sappers. At Seneneeyah there are (185 huts for a couple of infantry regiments, 1,000 strong each, and a very extensive range of barracks ¾ mile distant. On the opposite or right bank of the river are large factories, where about 300 men could be quartere From Seneneeyah to Damietta there a ferry boats plying; the river is deep and 35 to 400 yards across. The route from Rosetta to Damietta by Brul is scarcely practicable for artillery, and would be very harassing for infantry. But 500 French retired from Lesbeh (near Rosetta) to Brulos by this route, carrying four light gun with them.
		Foum Huddawee	16	0	150	4	... ...	There is a road by the beach from Damietta t the mouth of the Huddawee Foum. It is alon the high water-mark of the sea, similar to th coast road between Aboukir and Rosetta. Laden mules can travel it in three hours; it is, however, sandy and heavy. The Foum Huddawee is situated 9½ geographical miles north-east of Damietta and 8 miles east-south-east

Terr...	Authority.	Names of Stages.	Distance. Stage. Miles.	Distance. Stage. Fur.	Distance. Total. Miles.	Distance. Total. Fur.	Rivers.	REMARKS.
EGYPT.	HORSE GUARDS REPORT.	FOUM HUDDAWEE.—contd.	...	...	150	4	.. ...	of the Boghaz Forts. (Linant's map shews distance from Damietta by the coast line 16 miles.) The approach from the lake is difficult owing to an accumulation of mud at the entrance of the channel leading to the village, which consists of 80 or 90 reed huts. The entrance of this channel is about 1,200 yards from the village, and the village again is about a mile from the sea. The channel for 300 yards is only 10 to 12 feet wide, with 1 to 1½ feet of water and 1 foot of soft mud through which boats are poled. From this point the channel gradually widens to 15 feet, and deepens to 6 and 7 feet. From the village the channel leading to the mouth runs south-east for about ¾ mile, and then turns east by north for 400 yards, and joins the sea. From the village to the sea the deep water channel varies from 30 to 60 yards, with a depth of 4 to 7 feet, and over the bar it is 3½ feet. The bottom is firm near the sea; but towards the lake it becomes muddy. Outram says, the breadth is about 40 yards and depth 2 to 4 feet; the ground on either side being here, as at the other mouths, perfectly level and sandy. There is no surf at these entrances, nor are there any villages or permanent inhabitants. Troops landing at the mouth of the Huddawee could encamp to the westward, where the ground is firm and covered with marine shrubs. There is no fresh water to be procured nearer than Mattereeyah. Infantry could march by the sea beach to the Boghaz forts; but it is impracticable for guns. There are no defences whatever at this mouth. The town of Damietta and the minarets of Lesbeh are distinctly seen from it. From the Foum Huddawee to the towns of Mattereeyah, Menzaleh, and Damietta there is no direct passage by water; the direction taken is south-east, with 2½ to 4½ feet water. This course is taken to avoid a long low island. LeMessurier made the passage in June in 4 hours in a boat of 150 ardebs (ardeb=5 bushels). During high Nile there is a direct passage between the Huddawee mouth and the town of Lesbeh north of Damietta.
		FOUM DIBEH ...	10	0	160	4	... ...	Distance from Linant's map 14 miles. The Foum Dibeh is about half-way between the Huddawee and Jemmal mouths; it lies 14 miles north-north-west from the town of Menzaleh. This mouth is quite choked up; a new cut recently made by the Pasha is also partially choked to the distance of 250 yards from the sea, by an accumulation of sand in its channel, over which during high Nile a few inches of water may pass. There is an old fort here, but deserving of no notice; it is in ruins. The sands here are shifting. Twenty years ago the sea was close to the old fort; it is now (1850) upwards of 1,000 yards distant from it.

Territory.	Authority.	Names of Stages.	Distance.				Rivers.	REMARKS.
			Stage.		Total.			
			Miles.	Fur.	Miles.	Fur.		
EGYPT.	HORSE GUARDS REPORT.	FOUM DIBEH.—contd.	...	...	160	4	... ...	Outram says :—"Abas Pasha caused the present canal to be cut; it is 28 yards wide; but the junction of the canal with the sea was dry during my visit, at low tide; but at high and spring tides the canal joins the sea, though scarcely navigable. The fort is of brick and dilapidated, consisting of a centre tower and outer wall. It has an underground magazine and two wells of sweet water."
		FOUM JHEMMAL	10	0	170	4	... ...	Distance from Linant's map 6 miles. The Foum Jhemmal is the best of all the mouths; it is 6 miles north-north-west of the Island of Tenesis, and 10 (geographical) miles north-north-east of Mattereeyah. The main chanel is always clear with 3 to 6 feet of water. The passage over the bar is clear, with 4 feet over it, rapidly increasing to seaward to 6, 8 and 10 feet (June 1850). There are a few fishermen's huts here, but no defences or fresh water. Troops could encamp to the eastward, where the ground is firm, but contracted. Outram says :—"The breadth is 180 yards and depth 3½ to 5 feet."
		PORT SAID ...	8	0	178	4	... ...	Apparently 8 miles from Linant's map (which does not, however, shew the canal).
		FOUMS OF EL RAEE AND OOM FURRUDGE.	15	0	193	4	... ...	From Linant's map 12 to 15 miles east of Port Said. Very inferior openings, and impracticable for boats at all seasons.
		FARAMAH ...	10	0	203	4	... ...	At about 10 miles south-east and following the coast is Faramah. The road passes the fort of Tineh and the ruins of Pelusium. Faramah is on the edge of the desert beyond lake Menzaleh, and roads are shown in Linant's map as leading to Syria by the coast, passing Guereh, to Katieh on the road to El Arish (see Routes, 33, 34), and to Kantara on the canal. These are also shewn in H. Gds. Route map. The coast or sea beach between the Damietta and the ancient Pelusiac mouths is of uniform character, low and sandy, with no surf during the summer. In winter it is considered particularly dangerous, and ships would have to lie off 3 or more miles. The available information as to the above road from Damietta to Port Said and Faramah is very meagre. It is probable that the road is now frequently used and practicable for infantry at all events. For information as to Port Said, &c.—see "Suez Canal."

END OF PART I.

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